UNIVERSITY OF CALIFORNIA

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The Dynamics of Attention: Agenda Setting in the Modern Media Environment

A dissertation submitted in partial satisfaction of the

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in Political Science

by

Galen Asher Thomas Stocking

Committee in charge:

Professor Bruce Bimber, Chair

Professor Aashish Mehta

Professor Garrett Glasgow

June 2015

The dissertation of Galen Stocking is approved.

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Aashish Mehta

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Garrett Glasgow

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Bruce Bimber, Committee Chair

June 2015

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DEDICATION

To my mother, Patricia

ACKNOWLEDGEMENTS

Any undertaking as substantial as a dissertation cannot be done alone. Instead, the hard work and long hours in front of a computer are supported, both directly and indirectly, by dozens of friends, family and colleagues. In my case, my stuttering attempts at graduate school and this dissertation would have faltered several times without the support and aid of a broad network. To those people I owe my most heartfelt gratitude.

One of the most important of these individuals was, of course, Bruce Bimber, my committee chair and guide through my research explorations. His effectiveness stemmed from his early recognition of the best way to mentor me as a young scholar: quite simply, he set me free to investigate ideas and methods on my own, reeling me in when I ventured too far astray and making me defend and sharpen my ideas when they were ready. When I first started offering ideas for this dissertation, I came to him with almost a dozen half-formed, mostly outlandish and unworkable ideas. In sending me off to think about what I wanted to work on, he reinforced my independence and self-reliance as a scholar; in making me defend those ideas, he helped me critique my own ideas and taught me how to design workable research projects. Bruce also was encouraging when the horizon seemed both distant and so close I could touch it, provided eye-opening feedback that elevated the ideas to a new level, and actively facilitated my research through the procurement of social media data and the subsequent formation of a research group studying the phenomenon. He also offered indispensable guidance on professional matters both within the university and in the broader professional community; when the library challenged my use of campus resources, he helped me craft a response that eased tensions, and whenever I was headed to an academic conference he strategized with me about who to talk to and how to find common ground. And when I saw someone presenting research nearly identical to my own the day before I was to present mine for the first time, he helped me recognize the importance and uniqueness of my work, boosting my spirits and rescuing me from being swallowed by this disappointment. Because of these and innumerable other experiences, both this dissertation and my growth as a scholar are directly the result of his mentorship.

My other committee members, Garrett Glasgow and Aashish Mehta, were also instrumental in this dissertation, providing expert guidance in all things statistical. Garrett set me on this path, explaining the best methods for basic time series analysis. Aashish picked this up while Garrett was on sabbatical and helped push the dissertation's methods forward. Moreover, he was incredibly patient with my limited statistical training, pointing me to resources to help recover what I had forgotten from my coursework and explaining the complex mysteries of time series statistics. The fundamental insight of this dissertation – that agendas may be influenced over both short term and long term dynamics – emerged from conversations with Aashish. Additionally, because he came from outside both Political Science and Political Communication, his questions about my assumptions strengthened my arguments. Although incredibly busy, Aashish nonetheless went out of the way to find time for

me, even to the point of walking through methodological details as he packed for a months-long overseas research trip. I would still be investigating, and trying to understand, needlessly complex methodological side paths filled with Bayesian statistics without his guidance.

Others affected my research maturation without being directly involved with my dissertation. Foremost, Richard (Rich) Appelbaum was a close mentor and friend. Working with him in CNS sharpened my research skills, but almost as importantly, taught me how to be more than just a student and become a colleague. Over innumerable dinners with Rich and my two other graduate student colleagues, Xueying (Shirley) Han and Matthew Gebbie, I learned to truly appreciate the value of open dialogue with colleagues from multiple fields. Rich was also incredibly supportive in other ways, offering financial support to my dissertation, and, even though it was far afield from his own research interests, constantly expressing genuine interest in my intellectual and scholarly growth. Having my first advisor leave the university, Rich was the first long-term faculty member who made me feel like he was invested in me. And that's not to mention participation in the actual research itself, which took me to exotic locales in China and India, opportunities I would never have found otherwise.

Barbara Herr Harthorn and the Center for Nanotechnology in Society were also incredibly important for this research. Barbara was genuinely excited and supportive of this work throughout the duration of this project, and offered financial support in the form of work space and data procurement. Whenever Barbara talked about my work – which seemed to happen often – it was always gratifying to see the genuine enthusiasm she showed for it. I owe Barbara and the Center a permanent debt for helping me get this research off the ground and shaping my research skills.

Other faculty, particularly in Political Science, were important to this work. M. Stephen Weatherford went out of his way to forward me research and other opportunities, potentially relevant new research, and was always curious about my work. M. Kent Jennings and Eric R.A.N. Smith were similarly enthusiastic about my research and consistently optimistic in my potential. In my early graduate career, Lorelai Moosbrugger did much to shape me into the scholar I am today; it is a shame we could not work together longer. Support staff within the department were similarly supportive, especially Steve Wiener, who went out of his way to congratulate me on positive student evaluations, and Sharon Terry, who was always excited to hear what I was working on.

Graduate school is a struggle, even at the best of the times, and my fellow graduate students were an indispensible support network. Space constraints prohibit me from describing how each of them touched my life, but I do want to focus on a few who were especially important. Tabitha Benney, a few years ahead of me, took me under her wing and offered guidance on how to survive when I arrived at UCSB. Chris Welton offered similar guidance and encouragement. My officemate, Colin Kuehl, was effective at getting me to stop working and socialize from time to time. I will miss his beachside Kan-Jam games. Brian Lovato and I shared countless drinks at the U-Cenn, bonding over music, graduate school, politics, and everything else

under the sun. Two of my co-authors, Heather Hodges and Arial Hasell, helped sharpen each other's research questions about social media and politics. Julian Gottlieb was an important foil, challenging my technotopian impulse while remaining one of my closest friends. Moving in with him was a turning point in my graduate career, helping focus me on completing my dissertation. Emelin Gasparrini was incredibly supportive in the final grueling months of this project.

I was never satisfied with just being a graduate student; instead, I also threw myself into my role as Advisor for UCSB's Model United Nations (MUN) program. The students that passed through this club were inspiring in their dedication and their friendship helped make me more of a well-rounded person. While I will miss all of them, I am particularly thankful to Emily Nightingale, Anja Heppner, Jesse Lin, and Benjamin Pu. Given their example, I am confident that the club will remain in good hands for years to come, which vindicates the work I put into the program.

Several lifelong friends were important to my success as well. I am saddened that I didn't get to spend enough time with Chuck Crabtree and James Merrill, but their consistent interest in whatever I was doing as well as the sense when we spent time together that no time had passed helped ground me. Shane Muetzel, Chris Muetzel, and Mike Hillard are like family to me; the siblings I never had. Each were supportive in their own way, telling me when I was wrong, but supporting me anyway; being a sounding board for my crazy ideas; and just generally being companions on this journey. Mike's omnipresence online made us grow close over basically everything, from important philosophical discussions to idle chat. Knowing I could drop in on Chris and Shane at the end of a bad day or week and be greeted with open arms and the offer to go do something fun was crucial to my sanity, and I don't know what I will do without that option. As I move on with my career, I am deeply saddened by the infrequency with which I will see you and that I will not be able to see Donovan, Ryan, and Mike's yet unnamed little one grow. But I am grateful for the time we did have here together.

I would never have become interested in politics if not for my grandmother, who, at dinner one day during the 2000 election season, angrily challenged me to find a presidential candidate I liked and the justification for this support after I told her I wasn't planning to vote. Her efforts to make me a better citizen ended up shaping me in ways she never would have expected, and I am glad I was humbled that day.

But most of all, this dissertation, and all that I have accomplished in graduate school and in my professional and personal life would not have been possible without my mother's support. As a single mother, she taught me to never accept defeat and to always work toward new and better goals - and to harness my inner drive in the pursuit of these goals. She is a constant advocate for education and lifelong learning, and accordingly never hesitated to support any of my educationally-oriented adventures. Instead, she fully supported me in every way she could, and for that I am consistently grateful. Whenever I am feeling like I can't do something, or that it is too much work, I think about the sacrifices she made and continues to make for me. That has brought me here today. Thank you.

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VITA OF GALEN STOCKING
March 19, 2015

EDUCATION

University of California Santa Barbara, Santa Barbara, CA June 2015
PhD in Political Science
Fields: American Politics/International Development

California State University San Bernardino, San Bernardino, CA June 2004
Master of Arts in National Security Studies
Areas of Emphasis (2): Middle Eastern Studies and Terrorism
Thesis: The Threat of Cyberterrorism: Contemporary Consequences and Prescriptions for the Future

Gazi University, Ankara, Turkey Summer 2003
Turkish Learning Research and Application Center (TOMER)
Area of Emphasis: Turkish language

California State University San Bernardino, San Bernardino, CA September 2002
Bachelor of Science in Computer Science
Area of Emphasis: Artificial Intelligence

RESEARCH AREAS

- Cross-cutting research interests in political communication and comparative political economy
- Primary research in political communication, especially social media and traditional media
- Secondary research interest in comparative political economy, particularly the role of policy on innovation and corruption
- Other research interests in political representation and international security

AWARDS AND DISTINCTIONS

University of California Santa Barbara, Santa Barbara, CA
Graduate Research Fellow, Center for Nanotechnology & Society (2011-2015)
Center for Nanotechnology & Society Travel Grant Award Recipient
For Research in India (2014)
For Research in China (2012)
For presenting research in Netherlands (2012)
Lancaster Fellowship for International Relations (2010, 2011, 2012)
Nominated; Graduate Student Association Excellence in Teaching Award (2011, 2013)

California State University San Bernardino, San Bernardino, CA
Associated Students, Inc. of California State University San Bernardino, San Bernardino, CA

Research and Travel Grant Recipient (2003)
- Grant received for studies in Ankara, Turkey relating to Turkish perspectives of US Foreign policy

Phi Beta Delta – International Studies Honor Society (2003)

Pi Sigma Alpha – Political Science Honor Society (2003)

TEACHING

Instructor of Record, International Politics (Upper Division), Summer 2014

Teaching Assistant

Middle East Politics (Upper Division), Summer 2013, Summer 2012, Summer 2011
Social Movements (Upper Division), Spring 2011
Congress (Upper Division), Winter 2011
Theories of Comparative Politics (Upper Division), Fall 2010
National Security (Upper Division), Spring 2010

PUBLICATIONS

Published Work

Han X, Stocking G, Gebbie MA, Appelbaum RP (2015) Will They Stay or Will They Go? International Graduate Students and Their Decisions to Stay or Leave the U.S. upon Graduation. *PLoS ONE* 10(3): e0118183. doi:10.1371/journal.pone.0118183

Salmi, R., Stocking, G., (2005). United States Foreign Policy in the Middle East: Turkish University Students Respond. In Salmi, R., & Bayraktar Durgun, G., eds., *Turkish-U.S. Relations: Perspectives from Ankara*. Boca Raton, FL: BrownWalker Press, 13-28.

Bozonelos, D., & Stocking, G. (2003). The Effects of Counter-Terrorism on Cyberspace: A Case Study of Azzam.com. *Journal of the Institute of Justice & International Studies*, 3, 84-94.

Under Review

Appelbaum, R., Gebbie, M., Han, S., & Stocking, G. Will China's Quest For Indigenous Innovation Succeed? Some Lessons From Nanotechnology.

Appelbaum, R., Gebbie, M., Han, S., & Stocking, G. A Global Nanotech Education: Trend Analysis of Chinese S&T Students in the United States. 2015.

Hodges, Heather, & Stocking, G. A Pipeline of Tweets: Environmental Movements' use of Twitter in response to the Keystone XL Pipeline. 2015.

Stocking, G. Partisan Spheres: The Effect of Polarization and Fragmentation on the Media Agenda. 2015.

Works in Progress

Appelbaum, R. & Stocking, G.. The Influencers of Nanotechnology Policy Success: A Comparative Analysis. 2014.

Appelbaum, R., Herr Harthorn, B., Hasell, A., & Stocking, G. Twitter as a Tool for Public Engagement with Emergent Technologies. 2014.

CONFERENCES

Society for the Study of Nanoscience & Emerging Technologies Annual Meeting, Karlsruhe, Germany

Presenter, Prepared and presented paper entitled "Twitter as a Tool for Public Engagement with Emergent Technologies" (2014)

American Political Science Association Annual Meeting, Washington, DC

Presenter, Prepared and presented paper entitled "Partisan Spheres: The Effect of Polarization and Fragmentation on the Media Agenda" (2014)

International Communication Association Annual Meeting, Seattle, WA

Presenter, Prepared and presented paper entitled "A New Agenda Setting: New Media and the Hybridization of Agendas" (2014)

Western Political Science Association Annual Meeting, Seattle, WA

Presenter, Prepared and presented paper entitled "A New Agenda Setting: New Media and the Hybridization of Agendas" (2014)

Midwest Political Science Association Annual Meeting, Chicago, IL

Presenter, Prepared and presented paper entitled "A New Agenda Setting: New Media and the Hybridization of Agendas" (2014)

Society for the Study of Nanoscience & Emerging Technologies Annual Meeting, Boston, MA

Co-Presenter, Prepared and presented paper entitled "A Global Nanotech Education: A Trend Analysis of Foreign S&T Students in the United States" (2013)

American Political Science Association Annual Meeting, Chicago, IL

Presenter, Prepared and presented paper entitled "A New Agenda Setting: New Media and the Hybridization of Agendas" (2013)

Society for the Study of Nanoscience & Emerging Technologies Annual Meeting, Enschede, Netherlands

Co-Presenter and Panel organizer, Prepared and presented paper entitled "Can China Become a Nano Innovator?" (2012)

Center for Nanotechnology and Society Lecture Series, Santa Barbara, CA

Presenter, Presented research on Indian Nanotechnology environment (2014)

Presenter, Presented research on Chinese nanotechnology economy (2011)

California State University San Bernardino, San Bernardino, CA

Commentator, Undergraduate Panel entitled "Turkey's accession to the European Union" (2004)
Commentator, Undergraduate panel entitled "Western vs. Eastern cultural clash in Europe" (2004)
Chair, Undergraduate panel entitled "U.S. support for the International Criminal Tribunal for the former Yugoslavia" (February 2004)
Conference Assistant, Joint conference held by California State San Bernardino and King Saud University
(Saudi Arabia) entitled "United States-Saudi Arabian Relations in Light of the Current International Crisis" (January 2004)
Branch Chief, Team lead for National Intelligence Daily Simulation (January-March 2004)
Conference Assistant, "International Symposium on Turkish-US Relations," Joint Conference between
California State University, San Bernardino and Gazi University, Turkey, held in Ankara, Turkey (2003)
Team Chief, Algorithm Animation Project (2000)

Midwest Political Science Association Annual Conference, Chicago, IL
Presenter, Prepared and presented paper entitled "Turkey and the European Union: Perceptions and
Challenges" (2004)

International Studies Association Western Conference, Las Vegas, NV
Presenter, Prepared and presented paper entitled "Pakistan's Two Faces of Terrorism" (2003)

Counter Terrorism and Civil Liberties Conference, Warrensburg, MO
Presenter, Co-authored and presented paper entitled "The Effects of Counter-Terrorism on Cyberspace: A Case Study of Azzam.com" (2003)

International Studies Association Western Conference, Las Vegas, NV
Presenter, Presented paper entitled "Steganography and the Ever Changing Role New Technologies are Playing in America's Global Fight Against Terrorism" (2002)

Gazi University, Ankara, Turkey
Panelist: "Management, Economics and Politics: Challenges, Opportunities and Discipline Perspectives in the 21st Century" (2002)

PROFESSIONAL AND OTHER ACTIVITIES

Advisor, *Model United Nations*, UC Santa Barbara (2009-2015)
Panel Organizer and Moderator, Santa Barbara, CA
CITS Panel on Interdisciplinary Research Methods (2014)

Manuscript Reviewing
New Media and Society (2014)
Mentoring
Internships in Nanosystems Science, Engineering and Technology (2012-2013)
Oversaw research assistant (2012-2014)
Guest Lectures
Muslim Brotherhood and Social Movements (2014)
Agenda Setting (2012)
Staff, Northwest Model United Nations, Seattle, WA
Director General (2014)
Director, Special Simulations (2013)
Chief of Staff (2012)
Director, Security Council and General Assembly (2008-2011)
Staff, National Model United Nations, New York City, NY
Advisory Board Member (2008-2010)
Director-General (2007-2008)
Undersecretary General for Specialized Agencies (2006-2007)
Director, Security Council (2005-2006)
Assistant Director, Committee on the Peaceful Uses of Outer Space (2004-2005)
Head Delegate (2003-2004), Outstanding Delegation Award
Delegate (2001-2003), Outstanding Delegation Award both years
Staff, Invitational Model United Nations, Washington, DC
Director, Security Council (2006)
Director, General Assembly Third (2005)
Founding Vice President, Young Professionals in International Affairs, Washington, DC (2006-2007)

SELECTED PROFESSIONAL AND ACADEMIC EXPERIENCES

Pew Research, Washington, DC
Research Associate, Journalism (2015-present)
Analyzed trends in mass media production and consumption.

Digital Sandbox, McLean, VA
Risk Analyst (2007-2012)
Analyzed terrorism and natural disaster risk at the local, state, and federal levels.
Oversaw a team of 6 analysts.
Helped develop and implement risk assessment models.
Led industry-wide analysis of methodologies.

Freelance Editor (2002-2004)
Assisted with all stages of the writing process
Provided post translation editing for paper entitled "Issues in Modernization and Turkish Musical Policy" for Dr. Senol Durgun (2004)

California State University San Bernardino, San Bernardino, CA
Research Assistant (March 2002-June 2004)
Assisted college professor on several research projects, including studies on California mosques, Salafiism, and Weapons of Mass Destruction.
Managed several other students as they gathered data.

UNIVERSITY SERVICE

University of California, Santa Barbara
Founder, Job Applications Working Group, Political Science Graduate Student Association (2014)
Transition Committee, Political Science Graduate Student Association (2013)
Secretary, Political Science Graduate Student Association (2011-2013)
Prospective Student Coordinator, Political Science (2011)
Campus-wide representative (GSA), Political Science Graduate Student Association (2010-2012)
Member, Lancaster Room Committee, Department of Political Science (2010-2011)

California State University, San Bernardino
Student Ambassador (2003-2004)
Graduate Director, Board of Directors (2002-2004)
Executive Vice President Pro Tempore, Board of Directors (2002-2003)

ABSTRACT

The Dynamics of Attention: Agenda Setting in the Modern Media Environment

by

Galen Stocking

The media environment has changed dramatically in recent years. First altered by cable news, which upended the dominance of network news, digital media has in recent years created a media landscape littered with media outlets, from new, ambitious websites like Politico to citizen media sourced on Twitter. It is unclear how or if these changes have changed the relationship between the media and the public; indeed, despite considerable attention from scholars, the interdependencies between media elements such as professional news, blogs, social media, and the public that define the modern media have yet to be unraveled. Instead, several conflicting findings have emerged: some confirm the prevailing media to public agenda setting theory, others find a reverse agenda setting dynamic, while some uncover an interactive series of processes in which diverse elements influence the media and public agendas. I argue that modern agenda setting processes reflect a hybridized media ecosystem, with mutual interdependencies and feedback loops driving agenda creation. I further characterize the issues that are likely to emerge in particular elements and consider the role of partisanship. To test my hypotheses, I analyze longitudinal data on issue attention across five elements of the contemporary media system: survey data, Twitter, key blogs, a record of Google searches within the

United States; and top professional news sources. I track attention to 25 issues across a time horizon from January 2010 through December 2013. A lagged time series analysis further identifies issue origin points and trends as issues travel across elements. In order to further illuminate this relationship, I examine three of these issues in more detail by shining a light on the media and public discussions of these issues during periods of canonical attention. I also show how the rise of partisan media has changed the media agenda itself, with the result that different outlets attend to issues at different rates. This dissertation is therefore able to characterize the interdependencies inherent within the system that drive the public and media agendas, challenging some of the assumptions of a generation of minimal effects theories.

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Chapter One:
Introduction

On June 25, 2013, the Texas House of Representatives was in the final hours of a special session called to pass a set of measures, most notably a controversial abortion bill. State Senator Wendy Davis filibustered the bill for more than 11 hours to a packed chamber, but her efforts quickly reverberated online, where more than 182,000 people followed the filibuster online via live streams, Twitter, and liveblogs (Hooton, 2013). On Twitter, the resulting #StandWithWendy hashtag quickly became one of the Top 20 hashtags of all time by volume, one of the few political events to earn that distinction (Rogers, 2013). Traditional media outlets, who were until then providing marginal coverage of the abortion debate, began covering her efforts only after this explosion of attention online (Kollmeyer, 2013). Consequently, the media narrative about the event became as much about the online response as it was about Senator Davis' actions. Nonetheless, this increased coverage had almost no impact on public opinion, as measured by Gallup Most Important Problem polling: a week after the attention, when the next poll was conducted, abortion was named the Most Important Problem by just 1% of respondents (Gallup, 2013).

Public concern about unemployment has charted a different path. Mass media attention to unemployment peaked at the outset of the 2008 financial crisis, and then remained at a lower level in the years since. However, public opinion, as measured by surveys, has remained concerned about unemployment since, and at a higher level than at the media peak (Gallup, 2013). In other words, while the public continually

cites unemployment as an important problem for the country, the media does not give it a similar level of attention.

That these two issues took two different paths toward gaining and losing prominence within the media and public implies that the issues the media and public debates at any given moment are contingent upon a range of factors, including the nature of the issues themselves, the space within the media environment, and the impact on the public. Yet it also shows that the relationship between the media and the public is complicated, and potentially more complicated than current theory suggests. Agenda setting theory, as developed by McCombs and Shaw (1972), predicts that mass media attention to an issue will result in an increase in that issue's salience among the public, with some caveats, like the issue's day-to-day relevance to the public.

This made sense for this era. In 1972, there were three major television networks supplying the news along with some radio outlets and a few major national newspapers, but there was a distinct paucity of other choices. Satellite and cable television began to rise to prominence in the 1980s, bringing with them a proliferation of alternative sources for entertainment. Whereas in the pre-cable television days, early evening programming was dominated by the evening news (and no other options), the average American could now watch television in the evening without having to pay any attention to the network news (Prior, 2007). This likely diminished the agenda setting power of mass media.

The Internet created new opportunities for distraction from mass media, further eroding its agenda setting power. Besides millions of websites on any topic imaginable, the Internet also afforded new opportunities for expression by average members of the public. At first, this was limited to the creation of static websites and posting in online forums, but by the early 2000s, blogging offered a simple, user-friendly way to express one's thoughts. Blogs quickly began to cover political issues, and had some success in drawing mass media attention to issues, particularly in the 2004 Trent Lott scandal (Farrell & Drezner, 2008). This was largely driven by elite blogs that attracted high levels of Internet traffic but for whom the barriers to entry were low. Social media sites like Facebook and Twitter lowered those barriers further, and emphasized the ability to connect with friends, family, and acquaintances. Accordingly, these sites enabled discussion about politics between people with some level of trust, which can increase political knowledge (Himelboim, Lariscy, Tinkham, & Sweetser, 2012).

As discussion about politics online became normalized such that they began to resemble offline discussions, studies began to explore the individual level effects of online usage. For instance, Kenski and Stroud (2006) found that those who used the Internet to find political information had higher levels of political efficacy, knowledge, and participation. On the other hand, the incivility that regularly afflicts online discussion had mixed effects; in some instances it reduced the credibility, and thus the influence, of news sources and in other instances it enhanced it (Borah,

2013). In either situation, though, such findings reflect the continuing trend toward the dilution of traditional sources' influence.

This dissertation stems from questions about how effectively agenda setting theory could explain the public-mass media relationship in this environment. Agenda setting theory, like framing, priming, and the broader media effects literature, was defined in the latter part of the 20th century, under a markedly different media regime than exists today. Noting these changes, repeated calls (Bennett & Iyengar, 2008; Chaffee & Metzger, 2001; Holbert, Garrett, & Gleason, 2010) have been made in the last fifteen years to revisit these theoretical constructs and either replace them with more fitting theories or adapt them to the modern era. Despite some efforts that have looked at specific components of this ecosystem, this kind of broad thinking has not developed. Consequently, we have a developed understanding of slices of the agenda setting process in this environment, but have not built a theoretical understanding of the processes at play more broadly.

This is not to say that those efforts have been inconsequential. Blogging, in particular, received considerable attention in the mid-2000s. Some of these examined the role more generally of blogs in the political sphere (Farrell & Drezner, 2008; Swift, 2011), while others examined specific incidents in which bloggers upended the political debate (eg. Schiffer, 2006). Some (Meraz, 2009; Wallsten, 2008) directly addressed the question of agenda setting, finding mutual influence between blogs and mass media – a reversal of traditional agenda setting. Similar results have been found on Twitter (Kushin, 2010), Youtube (Wallsten, 2010), and similar sites.

Despite these efforts, the findings from each study stand distinct each other, and little work has been done to survey how the various elements of this environment interact. The most notable of these efforts was Neuman et al.'s (2014) examination of interaction between online behavior on social media and discussion forums and professionalized, mass media[1] over the course of 2012. Despite some technical limitations that limited their explanatory leverage, they showed substantial interaction between the public and mass media agendas, which points to the continuing need to clarify these interactions.

This dissertation seeks to resolve these questions. Specifically, in a media environment where uni-directional agenda setting does not incorporate all agenda setting activity, what are the specific pathways in which agenda setting occurs? To what extent and under what conditions does the public influence the media agenda? Does the state of the media, which is currently fragmented and potentially polarized, create new media dynamics? By answering these questions, my analysis improves the literature in several fundamental ways. Most significantly, it expands the universe of measures of public opinion from the survey only technique of the past several decades to include several alternate measures, therefore combining several previous approaches (as described below). This presents a fuller, more detailed picture of public opinion. Additionally, this analysis takes the important step of interpreting agenda setting through the lens of short-term and long-term influence, an approach

[1] Throughout this dissertation I will use "mass media" to refer to that segment of the media composed of articles or broadcasts produced by professionals, i.e. those who have made a career out of journalism. This lies in contrast to non-professionals, including "citizen journalists," who, while occasionally getting paid for their work, are not part of the mass media establishment as academics have traditionally conceived of it.

rarely taken before. The combination of these approaches sheds new light on agenda setting in the modern media environment.

I use several methods in this analysis. Drawing from a diverse range of measures of the public and media agendas, I track 25 issues over the time period 2010-2013 as their attention in the American mass media and public rose and fell. Furthermore, I survey this attention from across several measures of both the media and the public. On the media's side, I include articles from traditional mass media sources like newspapers and transcripts from the four major broadcast networks (ABC, CBS, NBC, and Fox) as well as radio news in the form of NPR. In addition to this, I include several 'new' measures of mass media. The oldest of these is talk radio, which I capture with transcripts from the Rush Limbaugh Show (there was no comparable talk radio show from the left side of the political spectrum). Among more modern sources, I include articles from online news sites like *Huffington Post* or *Politico*. Finally, reflecting the intermediary role elite blogs play, I include blog posts from top blogs, as measured by traffic and attention.

The public is measured through several measures of online behavior. Some of these are expressive, requiring a conscious effort on the part of the user to share her views: namely, blogs and Twitter. Not everyone uses these mediums, of course, so to capture a broader cross section of the public, I also include measures of search trends on Google and pageviews on Wikipedia. This approach is a break from traditional agenda setting studies, which have almost always been measured through surveys. However, surveys are slow, and therefore may not be responsive to the vacillations of

public opinion, thus obscuring many of the details of the media and public relationships.

Because this includes a broad spectrum of the public and mass media, I can confidently show that media and public attention cycles are often interactive; that is, that, contrary to much of the findings in agenda setting theory, the public can now set the media's agenda. Moreover, the public and media influence each other, with feedback loops between them pulling the others' attention to new issues. This expands agenda setting theory beyond its traditional causal mechanism, replacing the unidirectional, vertical interaction between the media and the public with a theoretical framework that allows for simultaneous, multi-directional, and feedback driven causation. This will lay the groundwork for future research that can help illuminate the interaction of these causal pathways, and, accordingly, the mechanisms underlying the creation and maintenance of the public and media agendas.

Chapter 2 sets up and explores the broad, system level dynamics of this interaction. It asks how extensive the mass media and the public agendas interact over time, and compares this across issues. First, I negotiate the results from offline agenda setting studies, which have shown the influence of the mass media persisting for up to several months; with those from online agenda setting studies that are often constrained to a week or less. To do so, I develop a theory of influence that includes long term and short term influence. Grounded in theories of priming for the public and the mass media's alarm/patrol model (Boydstun, 2013), I suggest that many of the issues that emerge within the national debate have some level of latent attention

based on previous cycles of attention. Accordingly, when an event occurs that triggers attention to an issue, that shift is more pronounced than it would be without that long-term effect. Second, I determine the most parsimonious model for each issue through an ARIMA model. Third, I test the direction of this influence using Granger causality, which determines if a restricted model (without the mass media, for instance, in a public focused model) describes the data better than an unrestricted model (with mass media included). Two Granger causality tests are run for each issue's mass media-public pairing; one with

The results are shown in Tables 2.2 and 2.3. Several findings quickly emerge. First, there are broad levels of interactions across issues, with the public and the mass media mutually influencing each other. This suggests that there are several feedback cycles driving this interaction, although this overhead view cannot really shine a light on the processes underlying those interactions. Second, there are several issues in which the mass media influences the public over both the long and short terms, but very few in which the reverse is true (just Climate Change and Arab Spring). Again, it is difficult to be certain as to the reasons for this, but it could be due to the working norms of the mass media, which does less reporting on long-term issues and attends more to events as they occur. Third, there are not strong correlations between how the mass media influences (or is influenced by) the two expressive forms of public opinion, implying that they are capturing different, though sometimes overlapping segments of the public. This extends to the other public measures as well. Finally,

while I categorize the issues included according to topic, there are few strong trends within each category.

Outside the theoretical development of long and short term lags, Chapter 2 does not attempt to apply any broad theoretical constructs or typologies to explain the different types of interactions evident in different issues. Chapter 3 accordingly explores the patterns of attention that explain the interaction uncovered in Chapter 2. Furthermore, it asks how this interaction occurs – what spurs salience to transfer between these segments of the media environment? This chapter is primarily composed of three case studies designed to investigate the particulars of this interaction: Fracking, Climate Change, and Gun Control.

First, though, I develop a typology to describe the patterns of interaction in the findings in Chapter 2. Accordingly, I break those issues down according to the direction of influence and which side of the ecosystem is activated first. Only one issue exhibits no interaction between the mass media and the public (Drugs), while a few have overwhelming influence in one direction only. Most, however, are bi-directional, with tight, interactive feedback loops between the mass media and the public. Many of these follow a similar pattern, however, in which attention explodes in the context of a crisis, and then quickly fades away, so these are categorized separately. The case studies selected include issues from the public influence over the media and these two bi-directional influence categories.

Having explored the interaction between the mass media and the public, Chapter 4 turns to the potential for multiple agendas within the mass media itself.

Specifically, it asks if the agendas of partisan outlets differ from the agendas of non-partisan outlets, as well as those from outlets from across the spectrum. This is important when considering how the mass media influences the public: since members of the public are likely to only get news from outlets with which they agree (Stroud, 2011), if the agendas of those outlets differ substantially, then their audiences may find some issues to be more important than their peers of a different partisan bent. This not only affects agenda setting theory but also could have ill effects on democracy. I dub these partisan spheres, in which the agendas of partisan public and mass media exist in spheres distinct from those of other partisans and non-partisans.

Outlets are therefore divided into left-leaning, right-leaning and centrist, as are issues. Results of ANOVA tests show that several issues do indeed receive unique levels of attention depending on the partisan leanings of the issue and the outlet. Left-leaning media is particularly adept at covering left-leaning issues at a higher rate than other media, although right-leaning media covers some of the most controversial left-leaning issues at a higher rate than any other outlets. Additionally, some of the most controversial issues receive similar coverage rates among outlets on both the left and the right and reduced coverage on centrist media, suggesting that partisan battles may be pitched within partisan camps before spilling over into centrist media.

The final chapter summarizes this work and draws it together in a discussion of the impact on basic democratic theory. It also stresses the limitations inherent in

this study, consequences of time, resources, and data availability. Accordingly, it outlines a series of subsequent studies that could greatly expand upon these results.

Taken together, the work within this dissertation attempts to sketch out some of the interactions between the mass media and the public within the parameters of agenda setting theory. While there may be some missing components (most notably Facebook), I have attempted to include measures that broadly represent the ecosystem and explore the particulars of these interactions. The results should serve as a building block for several future studies.

Chapter Two:
The Dynamics of Attention

Political communication scholars have traditionally viewed the mass media as a primary gatekeeper in society. In this role, the mass media can help the public understand the chaos of the modern world by emphasizing the salience of particular issues, dissecting political wrangling, and contextualizing major events. In many cases, the mass media's efforts reside at the nexus of all three: while explaining a major event, it describes the political ramifications and connects it to major issues for the public.

Before digital media, these dynamics were largely unidirectional: the mass media, defined as major national newspapers, the broadcast and cable news networks, and other major news outlets, were influential in creating and maintaining issue salience among the public. Agenda setting theory posited that, as mass media increased coverage of an issue, the public tended to view that issue as more important. Agenda setting research has shown that mass media's influence usually persists for one to eight weeks, depending on the portion of the mass media that transmits the agenda (e.g. newspaper vs. television news), with an average effect of around 3 weeks (McCombs, 2014). While some individual and issue characteristics mediate this relationship, the central truth of media coverage leading to increased public salience of an issue has been a distinguishing feature of agenda setting theory, supported across time and country.

The advent of digital media, however, infused this relationship with new

pathways of influence, elevated new voices, and accordingly provided an opportunity for the public to influence the mass media. Recent studies (e.g. Neuman et al., 2014) have shown some evidence of this reverse agenda setting in the modern media environment, but the large system dynamics that shape this environment are not yet well understood. How much power does the mass media retain in setting the publics agenda? In which situations and for which issues is it most influential over the public? Similarly, how much does the public influence the mass media and under what conditions? How long does this influence – whether of the mass media over the public, or the public over the mass media – persist?

This chapter probes those dynamics through an econometric analysis of mass media and public opinion data from 2010 to 2013. The data analyzed covers 25 issues ranging from social policy to economic issues to foreign-policy issues. It tests bi-directional agenda setting over the short and medium run. These dynamics are captured by the inclusion in the model of short-run lags of one to seven days and medium term lags of one to three months.

The resulting analysis shows that there is extensive bi-directional influence between the mass media and the public, although the effect varies by issue and source of influence among the public. Moreover, it suggests that agenda setting effects of the media can linger among the public for multiple months in some instances. Again, these results vary by issue, suggesting that the nature of public and mass media effects can not be broadly applied without attending to these nuances.

Conceptual Framework

Agenda Setting

The media's influence over public opinion has been an important area of interest throughout modern political science, and agenda setting has been one of the primary theoretical constructs explaining media effects throughout the past 30 years (McCombs, 2004). Agenda setting refers to the process by which issue salience is transferred from the media to the public: over time, the rank order of issues to which the media gives prominence will be reflected in the list of issues the public considers important (McCombs & Shaw, 1972). Agenda setting has been found to describe the public – media interaction across an array of issues, including environmentalism (Ader, 1995), civil rights (Winter & Eyal, 1981), immigration (Dunaway, Branton, & Abrajano, 2010), foreign affairs (Wanta & Hu, 1993), and many others, in the United States and abroad, and in surveys and experimental research (i.e. Iyengar & Kinder, 1987).

The effect can be constrained, however, both at the issue level and the individual level. At the issue level, the primary constraint is the obtrusiveness of an issue (Neuman, 1990; Winter & Eyal, 1981; Zucker, 1978), although how dramatic or conflictual an event is (Birkland, 1998) can raise the agenda setting capacity of the media. At the individual level, a person's need for orientation (McCombs & Weaver, 1985), trust in the media (Wanta & Hu, 1994) and his or her engagement in interpersonal discussions (Wanta & Wu, 1992) can further alter this relationship. Despite these efforts, though, several areas of agenda setting theory remain ripe for

investigation, including changes as a result of the media environment, issue or individual characteristics, and network effects.

The Modern Media Environment

Despite the breadth of agenda-setting efforts, few agenda setting scholars have fully characterized how the relationship between the public and the media has been altered by the changes in the media environment. McCombs and Shaw's initial study, and many subsequent studies, were conducted in a limited, vertical media environment. In this environment, which was dominant throughout much of the latter half of the 20th century, newsworthiness was decided by a few mass media sources, such as *The New York Times, Washington Post*, and the nightly network news (Williams & Delli Carpini, 2011). Their agenda decisions were largely mimicked by smaller regional papers (Danielian & Reese, 1989), with the result that anyone paying attention to almost any media source was likely exposed to a similar agenda (Prior, 2007).

With the advent of the Internet, and particularly its facilitation of easy content creation and distribution and the corresponding rise in consumer choice, the universality of the mass media's agenda setting power may be diminished, and, perhaps, upended. In a 2001 article, Chaffee and Metzger cautioned that the agenda-setting research question may become reversed: that the important consideration may become "what issues people tell the media they want to think about," rather than what issues the media covers (Chaffee & Metzger, 2001, p. 375). Such changes would necessitate a visitation of media effects theories, they claimed. Similarly, Bennett and

Iyengar (2008) called for a new era of theory building that accounted for changes in the media environment that accounted for the fragmentation of audiences and their ability to produce and distribute content. In response, Holbert, et al. (2010) countered that existing mass media theories could be adapted to the new media environment.

Indeed, scholars have thus far largely worked within the boundaries of agenda-setting theory, exploring how the new environment alters some of its assumptions. One of the major questions has revolved around the direction of agenda-setting: whether or not the mass media still sets the public agenda, or if the public can influence the mass media's agenda. Defining the public as those who post content online and are not members of the media, early Internet era research showed a uni-directional, professional media to Internet agenda setting effect occurring both in blogs (Lee, 2007) and online discussion forums (Roberts, Wanta, & Dzwo, 2002). In contrast, other scholarship showed a limited bi-directional effect, with the media and the public mutually influencing each other's agendas in blogs (Messner & Garrison, 2011; Schiffer, 2006; Wallsten, 2007) as well as Twitter (Kushin, 2010). In a broad study, Neuman, et al. (Neuman et al., 2014) showed bi-directional agenda interaction between the mass media and the public (defined as blogs, Tweets, and forum postings) across several issue domains.

Such top-level results may obscure some of the conditions under which this bi-directional effect occurs, however. In a comparison of left and right of center blogs, Meraz found that the agenda of left leaning blogs was more likely to be guided by professional media than that of right leaning blogs, with weakened influence of

media elite (2011a). Schiffer found that left-leaning bloggers were influenced by media coverage, but that these blogs influenced the media as well, with op-ed columnists acting as the primary transmission avenue for blogs into the media (2006). Similarly, Wallsten uncovered a far more influential role for the public than for the media in driving attention to prominent Youtube videos, although the campaign setting of his research may limit the extension of these results to other time periods (Wallsten, 2010). Nonetheless, recent research has shown that members of the media pay close attention to online discussion through reading blogs and Twitter and watching article reading and sharing statistics (Hermida, Fletcher, & Korell, 2012; Verweij, 2012; Wendelin & Neubarth, 2013).

Chadwick suggests that this results from the newly hybridized media environment, in which the sources of power, practices, and communication structures are shaped by the continuing influence of old media as it interacts with new media (2013). Because of this hybridity, it may not matter where a story begins – whether it's with the public or the media – as much as that it attains salience with some element of the public or the media, which will then influence other elements of the public and the media. In other words, the media and the public agendas will exhibit similar characteristics, namely responsiveness and interactivity, no matter whether the cycle begins with the media or the public. This leads to my first hypothesis:

> *H1: Attention to issues in non-professional media, particularly expressive media like Twitter or blogs, will both influence and be influenced by the broad media agenda. Accordingly, the agendas of the public and mass media entities will interact, meaning that as attention in one agenda to an issue rises or falls, the other agenda will reflect those changes.*

Influence Persistence

While inspired, Neuman, et al.'s 2014 analysis of social media and mass media agenda interaction was limited in that they did not examine interaction that persisted longer than one week. This decision is justified by Roberts, et al., 2002, in which the authors similarly decided to not examine lags longer than 7 days because they didn't expect effects to persist longer than that online; and Wanta (1997), which did not thoroughly investigate online agenda setting (and actually found that effects sometimes persisted for months). [2] Yet there are reasons to believe that agenda setting influence will take longer than one week to decay, especially from the mass media to the public. On the one hand, people's online activity is not purely driven by what they encounter online, as the inclusion of broadcast media such as television news suggests. Indeed, since offline interaction with peers may mediate the agenda setting process, it may also be the case that it extends the process longer than would be expected if one was only influenced by online behavior (Wanta & Wu, 1992). Moreover, traditional mass media sources have been found to affect the public at time intervals lasting from 1 to 8 weeks (Wanta & Hu, 1993). Combined, this suggests that the influence of the mass media over the public have the potential to persist longer than one week. The most

[2] As an example, long-term influence from one agenda to another will be part of the influence registered in a seven day lag measurement. However, it is difficult to untangle the differences between long and short term influences when measured at only a short interval.

effective technique to measure this is through impulse response functions (see Chapter 3).

But what of reverse agenda setting – the influence of the public over digital and mass media? Since they were conducted in the pre-Internet era, Wanta and his collaborators' work examined mass media's influence over the public and eschewed any reverse agenda setting effects. The question of how the media selects which news to cover is outside the scope of this paper; one prominent theory suggests that the media indexes their stories according to the views of relative political actors (Bennett, Livingston, & Lawrence, 2007); other theories stress the gatekeeping and institutional norms that guide editorial decisions (e.g. Gans, 2004).

However, one such set of theories, which deal with the dynamics of mass media attention, is relevant to this discussion. Boydstun (2013) makes a case for a hybrid alarm/patrol model that incorporates time effects into an argument about mass media attention. In this model, when a major event occurs, the mass media rushes to cover the story, often crowding out space for other stories. As demand for more information rises, the mass media enters patrol mode, in which journalists and outlets look for new angles to the story and for new, related stories. Consequently, when the mass media is in patrol mode, small events that may not otherwise receive broad attention are promoted to the top of the mass media agenda. The mass media has, in essence, primed itself to believe those stories are important. After several days

or weeks, then, the immediate explosiveness of the alarm mode may decay, but new events can elevate attention again (Boydstun, 2013). This reflects the persistence of long and short term effects.

Because mass media to public agenda setting is possible only through a similar priming mechanism, it is likely that the mass media's effect on the public will follow a similar pattern. It is not clear, however, whether the public will influence the media to a similar extent – causing the media to go into alarm mode – or how long those effects will persist, and it is likely that each will vary by issue. That leads to the following hypotheses:

> *H2a: The mass media will influence the public over both the long and the short term, with increases in mass media attention leading to increases in public attention, and at different rates depending upon the issue.*
> *H2b: The public will influence the mass media over both the long and the short term, with increases in public attention leading to increases in mass media attention, and at different rates depending upon the issue.*

I expect Hypothesis 2a to be true across most issues, but that Hypothesis 2b will be less consistently supported.

Data and Methods

Data Collection

This study collected measures of the mass media and public opinion from the period 2010-2013 for 25 issues (see Appendix A for the issue and keyword list). This period is broad enough that it incorporates both election and non-election years in American politics, but is not so long that the structure of the media ecosystem has

radically altered. In other words, a savvy consumer or member of the mass media from the beginning of 2010 would likely largely recognize the 2013 environment. Several methods were utilized to collect these measures across the mass media and public domains, although each source was ultimately collected by a series of keyword searches for each issue.

Issues and their appropriate keywords were selected through a multi-stage process. First, I surveyed other literature that looked at several issues, particularly the Policy Agendas Project (*policyagendas.org,* n.d.) and the Most Important Problem Codes developed by McCombs and Zhu (1995). From these sources, I selected general categories and specific issues from this list and supplemented it with a few of my own, namely net neutrality and fracking. I then developed an extensive set of keywords for each issue through coordination with several peers inside and outside of academia. With this list of potential keywords in hand, I underwent several rounds of testing per issue to determine what elicited the most accurate results from the associated database.

Mass Media Sources. Mass Media data came from several types of outlets: broadcast transcripts, newspapers, websites of major digital outlets, and influential blogs.

Most broadcast media, for which transcripts were analyzed, were collected from Lexis Nexis queries for each relevant issue. Sources included nightly news broadcasts from ABC, CBS, and NBC, as well as cable news broadcasts from CNN, Fox News and MSNBC, and radio broadcasts on NPR. I also included talk radio

transcripts from Rush Limbaugh's radio show, which were retrieved by scraping rushlimbaugh.com using a custom python script.

I limited newspapers to the top 25 newspapers by circulation, as ranked by the Association for Audited Media. The resulting list includes national newspapers like *The New York Times* as well as more local newspapers like *The Houston Chronicle.* I also included news wire services like the Associated Press. These data were collected from Crimson Hexagon, a media data company whose dataset includes articles scraped from media websites. Accordingly, the newspapers dataset includes articles that would be found in the print edition of the database as well as prominent blogs on the newspaper website.

Finally, reflecting the changed landscape of the media environment, I included prominent digital media sources like *Talking Points Memo* or *Daily Caller* as well as influential blogs. These sources were selected from Technorati.com's U.S. Politics category for blogs and news sites. When it catalogued the growing digital media sphere (the company changed its mission in 2014), Technorati rated each site according to its relevance and the number of times it was linked to by other blogs and digital news sites. Accordingly, I looked at monthly archived versions of Technorati.com on the Internet Archive (archive.org) over the time period of this analysis. Sites were included if they were rated among the top 30 most influential blogs or news sites 3 or more times during this period. Finally, article data for these sites was downloaded from Crimson Hexagon using keyword searches. A full list of these sources is available in Appendix B.

Public Sources. The traditional agenda setting metric of the public's agenda has been surveys; namely, surveys that ask respondents a variation of "What is the most important problem facing the country today?," also known as the Most Important Problem (MIP) question. Despite the distinguished set of research utilizing the MIP metric, a number of criticisms of this method have emerged. The first suggests that the causal link between an issue's prominence in the media and salience among the public may not be best measured by the Most Important Problem question. In essence, this critique suggests that people are not responding to the question with their personal feelings regarding the most important problem but instead their perception of what the rest of the public believes is important. Cues regarding the public's views are actually found in the media. For instance, a survey respondent may find himself unemployed, but because the media proclaims that the economy is doing well, he does not believe that other people think this is an issue, so he responds with his estimation of the public's view of the most important issue. The actual issues the respondent selects may be further based on individual behavior, such as selective exposure and perceived credibility of media sources rather than her actual opinion (Huck, Quiring, & Brosius, 2009).

Second, agenda setting theory is premised on the transfer of salience from the media's agenda to the public's agenda. However, salience and importance do not carry the same meaning; nor do issues and problems, yet agenda setting literature treats them as fundamentally the same concepts (Wlezien, 2005). Additionally, problems are often more narrowly defined than issues, yet most agenda setting studies

group problems and issues together in a blunt metric. Such concerns raise questions regarding the transfer of salience over a discrete problem in the media to salience of an entire issue or from an issue to a problem (Atwater et al., 1985).

Third, the results to the most important problem question may not be equal over time as the number of problems being discussed vary. Consequently, a ranked ordering of problems does not convey the magnitude of separation between problems, assuming the first and second most important problems hold relatively similar salience over time (Jones & Baumgartner, 2005). Finally, and perhaps most important for the modern media environment, the time required to deploy, analyze, and publish a survey inhibits its utility in interpreting a fast-moving news cycle.

Accordingly, I replace the traditional survey metric with several alternate measures of the public agenda, all of which rest on the assumption that measuring the public's attention to an issue is comparable to survey responses. Grounded in the recognition that an individual's behavior will reflect her interests (at least at the moment in which the behavior takes place) in that she is choosing to direct her attention toward that issue rather than others, this assumption does not differ dramatically from other agenda setting assumptions. For instance, media's power in setting the agenda is rooted in the conflict between the infinite number of news or relevant issues and the finite number of issues an individual can cognitively attend to. Furthermore, as the media itself serves as the conduit between world events and the masses, it is itself limited on an institutional level by resources, television time or newspaper space, and in many cases the market driven imperatives of the media

entity - just as an individual is limited by his cognitive capacity to make sense of the world around him (McCombs, 2004). In both cases, the restriction is of a zero-sum conceptualization of attention - an individual's ability to attend to a limited subset of the world around him, and, in turn, the institutional limitations of the media, which is limited by the cognitive capabilities and status quo tendencies of the people that are involved. Jones and Baumgartner frame this as the limitations of attention, and present a compelling argument that these cognitive limitations drive much of the public agenda (Jones & Baumgartner, 2005).

These attention-oriented measures of the public agenda include Google search trends, Wikipedia page views, Tweets from Crimson Hexagon's historical archive of the Twitter firehose, and blog postings recorded by Crimson Hexagon. Utilizing these multiple metrics is more cost-effective than surveys while sidestepping some of their concerns, offers greater theory building and testing options, can be more sensitive to rapid or subtle agenda shifts, and may help paint a more complete picture of the public agenda than surveys or social media alone. Surveys are not included in this analysis because the time period between them (Gallup surveys are monthly; all other data is daily) means they do not fit easily into any econometric analysis without using interpolation between monthly data points – and doing so obscures much of the variance shown by other metrics. Additionally, the use of Google search trends and Wikipedia pageviews provides some access to portions of the public that are not active Twitter users or bloggers. It accordingly may be able to pick up some of latent

dynamics within the media system that draw on offline attention or attention on social media sites that do not make user data available (e.g. Facebook).

I accordingly collected a large amount of data to build the mass media and public attention datasets. Across 25 issues and four years of data from a wide range of media outlets, this resulted in approximately 250 GB of data in text format, which was stored in a SQL database. The data downloaded included all media data, blog data, and Wikipedia page views. Tweet data were drawn from Crimson Hexagon's daily count by keyword, so the individual Tweets did not need to be stored locally (although I did download a random sample for verification purposes and to inform Chapter 3). Search data were similarly gathered; I downloaded daily data from the Google Trends website.

A constellation of studies have employed similar methods. One of the earliest used Yahoo! Buzz data on searches and viewed news content to develop a record of attention to the same sex marriage issue (Hester & Gibson, 2007). Building on their approach, Weeks and Southwell (2010) used data from Google Trends, which aggregates all searches for a given search term to analyze attention to political rumors. Similarly, Scharkow and Vogelsong used Google Insights for Search (which was later merged with Google Trends) to track interest in a political candidate (Scharkow & Vogelgesang, 2011).

Other studies, particularly those addressing blogs and Twitter, have used online discussion as an agenda proxy. Some of the earliest studies simply sought to characterize the network within the blogosphere (Adamic & Glance, 2005; Hargittai,

Gallo, & Kane, 2007). Others have used blogs as a proxy for public discussion and analyzed the agenda setting relationship between blogs and the professional media (Wallsten, 2007; 2010; Woodly, 2007), while a large set of studies have used Twitter in much the same way (Leskovec, Backstrom, & Kleinberg 2009; O'Connor, Balasubramanyan, Routledge, & Smith, 2010). Finally, Neuman, et al. (2014) concurrently conducted a similar study comparing media stories to Twitter, blogs, and forum comments.

Accordingly, the employment of an attention-specific method is not novel, but it does not appear that many others have explicitly justified this approach nor emphasized the difference between measures of salience and measures of attention. As alluded to above, these are not the same; in fact, it is possible that an aggregate measure of attention does not even measure a similar concept since an individual may search for, read, or tweet about issues that are of little long-term personal significance. Unfortunately, such questions are outside the scope of this paper; for now, the existence of previous studies that effectively include similar measures provides the necessary impetus for this approach.

To gauge an overall effect of the public's presence in this environment, I combined these variables into a public opinion index using Principal Components Analysis (PCA), which identifies the components within a set of variables that define the co-variance of those variables. Each component represents this co-variance in a single dimension (eigenvector) across all variables; combined, the co-variance across components should approximate to 100% of the variance across variables. Variance is

described by the eigenvalue of each component; the first component always has the largest eigenvalue (or explains the most variation). In the construction of an index such as this, components with an eigenvalue greater than one are usually considered to incorporate enough of the variation to sufficiently describe the underlying dynamics of the data (Vyas & Kumaranayake, 2006).

Issue Queries. Upon the selection of each issue, a sample query of news articles was run using the issue name and any obviously relevant terms (for instance, I searched for both "climate change" and "global warming"). I then randomly sampled these news stories to find other terms that seemed to come up regularly. If any such search terms were uncovered, a secondary search was run including those terms and excluding the original term (e.g. "planned parenthood" and not abortion). Because of their relative brevity, blog searches utilized the same queries.

The other measures required a more complicated approach. For Wikipedia, I selected relevant pages from a Google search of the Wikipedia site or were listed on the issue category page and gathered pageviews of those topics using a custom python script to access the Wikipedia pageviews Application Programming Interface (API), found at stats.grok.se. The resulting daily aggregate is a sum of the views of all related pages.

Google Search data was first limited to the United States. I then entered search terms from the news collection method and added additional relevant terms as indicated by the Google Search engine, which suggests related search terms. Often, there was no clear variation between related search terms, so they were eliminated.

Tweet collection was the most complicated of these methods, requiring multiple approaches to develop the query. First, I searched Google for the already developed query terms and "hashtag" in order to retrieve relevant hashtags and news articles about Twitter campaigns or activity. Second, I searched Twitter itself for the term over the course of several months, noting relevant terms that could be used in the resulting query. Finally, before using the set of search terms for each issue, I tested each search term to ensure it does not retrieve spurious results. After the removal of hashtags, these Twitter search term sets were also used for blogs.

Attention Aggregation. For most data types, aggregation was simple. Mass media, blogs, and tweets were identified according to their publication date; the sum of the day's published work on an issue represents the amount of attention accorded that issue that day. Similarly, Wikipedia's attention is a sum of all pageviews of all pages identified as related to the issue.

Aggregation of Google searches was more complex, largely because Google Trends provides two different metrics of Google searches at different time intervals. If searching over a time period shorter than 90 days, it will provide a daily measure of searches. Any period longer than 90 days returns search trends aggregated to the weekly level. The returns themselves are not a direct measure of the number of searches (which is proprietary information), but a measure known as the query index. This, in turn, is derived from the query share, which is described in a paper by two Google employees as the:

> "total query volume for the search term in question within a particular geographic region divided by the total number of queries in the region during

> the time period being examined. The maximum query share in the time period specified is normalized to be 100, and the query share at the initial date being examined is normalized to be zero." (Choi & Varian, 2012)

Consequently, the data from each 90 day period are not on the same scale. However, they can be combined by using weekly data as an index and scaling the daily measures from each subperiod to the weekly scale. There is no clear, Google endorsed way to combine this data, and I have found no one in the literature that does so. Accordingly, the method I devised assumes that each weekly data point reflects the mean query index for that week. I then find the mean of all daily values for each week, and scale the difference between each day's values and the calculated mean to the level of the weekly data.

Proportional Attention. The final analysis does not use a simple measure of the amount of attention afforded an issue on a given day but the amount of attention as a proportion of all activity on that day. The denominator in this equation could be the number of articles published across a newspaper or stories on a news broadcast or the number of tweets or blog posts. Measuring attention in this manner helps alleviate trends caused by extraneous variables (such as increased use of Twitter on the part of the public), keeps all data in the same format as Google searches, and, substantively, helps contextualize attention in a crowded media environment.

Converting data types other than Google search into this proportional measure required some measure of all attention for that data type. In some instances, the databases used posed limitations on queries that would allow this. For instance, Crimson Hexagon does not allow blank searches, whereas Lexis Nexis does, and

Wikipedia's pageview statistics have no comparable metric on a daily basis. Accordingly, the measure of all attention on broadcast media from Lexis Nexis – ABC, CBS, CNN, Fox News, MSNBC, NBC, and NPR – includes all available transcripts, with no limitations imposed by the search. I re-scraped RushLimbaugh.com with the search term "the" to retrieve this metric for this data type. Mass media and digital media sources, including blogs, from Crimson Hexagon also used a query string with just the word "the." To incorporate tweets that do not use "the", the query string "the OR a" was used, and tweets were limited to English. Finally, to measure the total attention on a given day to Wikipedia, I used the number of pageviews on the front page.

Analysis

Statistical analysis was performed through the use of an Autoregressive Integrated Moving Average (ARIMA) approach. This class of analysis, designed for time series data, incorporates autocorrelation in the data, or instances in which present values of the dependent variable are influenced by previous values of the dependent variable, not just the independent variables. This is important for time series data, which often features long trends. Consequently, this approach allows for the selection and analysis of the best fitting model for each time series, which enables the analysis of the short and long term influence of earlier values in the dataset. A series of ARIMA tests were conducted on each data series – public and mass media – for each issue, with the public an independent variable in the mass media model and vice versa. A test for each potential lag structure of a combination of 1-7 days and 0-3

months for both the dependent and independent variable was conducted for each issue, followed by an Aikike Information Criterion (AIC) test, which shows the goodness of fit. The lag structure with the lowest AIC is the most parsimonious model (Enders, 1995). This determines which lag structure to use in the following analysis.

The agenda setting effect was measured using Granger Causality, which allows one to determine the effects of one series of time-specific data on another by determining if future values of Time series A can be better predicted by values of Time Series B than just by looking at Time Series A alone. While relatively underutilized in political science, it is a favored tool of econometrics literature because it overcomes issues of spurious relationships in lagged regression analysis (Kennedy, 2003). In an analysis of previous studies using each time series, Freeman found that the Direct Granger approach, despite several potential issues, is the best method for the analysis of political time series data. Nonetheless, problems can arise from its generalizable nature, such as when the researcher does not allow for the appropriate amount of lagged periods because there may not have been time for the effects to manifest, has a limited dataset, excludes causal variables, or ignores feedback effects between the two time series or complications caused by actor knowledge of previous effects. These are all factors that can be controlled for with proper model specification and theory building, however (Freeman, 1983).

Accordingly, because agenda setting theory has been supported robustly across time and environment, the causal link between media and public agenda allows

for a similarly robust theory driven model. Consequently, several agenda setting studies in recent years have adopted this method (e.g. Jenner, 2012; Meraz, 2011b). In this analysis, my first model contains all public or mass media variables, while my second model (Model B, the restricted model), excludes the independent variables. For example, in a test of mass media's influence over the public, the public is the dependent variable whereas the mass media is the independent variable. If Model B, which excludes the mass media variables, has less explanatory power than Model A, which includes them, then it can be said that mass media attention Granger causes public attention.

In the included analysis, I conducted at least 10 ARIMA and Granger tests for each issue (issues whose data required the inclusion of multiple principal components in the public opinion index required two additional tests for each additional component). These tests are: mass media's agenda setting influence over the public as a whole (with public opinion measured by the principal component or components), twitter, blogs, Google searches and Wikipedia page views; and, in the opposite direction, those public sources' influence over the mass media. In other words, each element of the mass media-public relationship were tested together and separately for each issue.

Results

Public Index

Table 2.1 shows the results from the principal components analysis for each issue. It reports the first two components, along with their eigenvalue and the

proportion of the variance they represent. It also includes each component's loading coefficient for each public opinion variable.

Table 2.1. Principal Components for each Issue

			Coefficients			
Issue	Eigenvalue	Proportion	Twitter	Blogs	Google	Wikipedia
Social						
Abortion						
Component 1	2.404	0.601	0.525	0.487	0.567	0.407
Component 2	0.978	0.245	-0.307	-0.553	0.229	0.740
Healthcare Reform						
Component 1	2.622	0.656	0.462	0.530	0.531	0.473
Component 2	0.848	0.212	0.553	-0.463	-0.471	0.507
Race						
Component 1	2.009	0.502	0.547	0.606	0.518	-0.255
Component 2	1.081	0.270	0.301	-0.215	0.357	0.858
Reproductive Rights						
Component 1	2.814	0.704	0.531	0.500	0.502	0.465
Component 2	0.517	0.129	-0.166	-0.510	-0.094	0.839
Same Sex Marriage						
Component 1	2.998	0.749	0.527	0.478	0.507	0.487
Component 2	0.458	0.115	-0.123	0.729	0.082	-0.668
Environmental						
Climate Change						
Component 1	2.361	0.590	0.583	0.518	0.571	0.257
Component 2	0.913	0.228	-0.113	-0.254	-0.085	0.957
Fracking						
Component 1	2.807	0.702	0.505	0.503	0.534	0.455
Component 2	0.649	0.162	-0.424	-0.473	0.214	0.742
Entitlements						
Medicare						
Component 1	2.548	0.637	0.501	0.515	0.460	0.522
Component 2	0.684	0.171	-0.590	-0.248	0.755	0.146
Social Security						
Component 1	2.033	0.508	0.554	0.505	0.446	0.490
Component 2	0.793	0.198	-0.338	0.386	0.626	-0.587
Welfare						

Component 1	1.792	0.448	0.607	0.062	0.615	0.500
Component 2	1.019	0.255	0.061	0.978	-0.195	0.045
Economic						
Deficit						
Component 1	2.694	0.674	0.534	0.560	0.397	0.494
Component 2	0.688	0.172	-0.311	-0.224	0.913	-0.142
Inequality						
Component 1	1.967	0.492	0.523	0.549	0.599	0.258
Component 2	0.957	0.239	-0.078	-0.331	-0.033	0.940
Taxes						
Component 1	2.247	0.562	0.558	0.352	0.559	0.502
Component 2	0.842	0.210	-0.347	0.919	-0.079	-0.172
Unemployment						
Component 1	1.611	0.403	0.634	-0.469	0.179	0.588
Component 2	1.325	0.331	0.007	0.594	0.771	0.232
Law and Order						
Crime						
Component 1	1.912	0.478	0.599	-0.098	0.555	0.569
Component 2	1.218	0.305	0.065	0.849	0.412	-0.325
Drugs						
Component 1	1.537	0.384	0.651	0.590	0.355	-0.320
Component 2	1.219	0.305	0.041	-0.079	0.697	0.712
Gun Control						
Component 1	3.126	0.782	0.480	0.522	0.521	0.476
Component 2	0.378	0.094	-0.228	-0.300	-0.293	0.879
Immigration						
Component 1	2.541	0.635	0.573	0.461	0.594	0.326
Component 2	1.015	0.254	-0.029	-0.580	0.031	0.814
Foreign Policy						
Afghanistan						
Component 1	2.217	0.554	0.542	0.440	0.561	0.445
Component 2	0.860	0.215	0.307	0.630	-0.264	-0.663
Iraq						
Component 1	2.519	0.630	0.528	0.366	0.554	0.530
Component 2	0.849	0.212	0.169	0.838	-0.345	-0.387
Terrorism						
Component 1	3.268	0.817	0.512	0.494	0.468	0.524
Component 2	0.420	0.105	-0.514	0.257	0.722	-0.386
Arab Spring						
Component 1	2.454	0.614	0.472	0.570	0.540	0.400

Component 2	0.881	0.220	-0.605	-0.190	0.170	0.755
Other						
Labor						
Component 1	2.080	0.520	0.593	0.579	0.480	0.287
Component 2	0.922	0.231	-0.027	-0.269	-0.204	0.941
Education Reform						
Component 1	2.251	0.563	0.529	0.374	0.567	0.509
Component 2	0.811	0.203	-0.193	0.912	-0.355	-0.074
Net Neutrality						
Component 1	3.305	0.826	0.527	0.515	0.515	0.438
Component 2	0.458	0.115	-0.276	-0.329	-0.146	0.891

Public opinion on most issues loaded primarily on the first component, with only Race, Welfare, Unemployment, Crime, Drugs, and Immigration requiring two issues to capture a significant percentage of the variance (no issues required three components). For all other issues, the first component captured from 49% (Inequality) to 81% (Terrorism) of the variance. The disparity in explanatory power of the first component in many cases reflects the strength of secondary component trends; those issues with the lowest first components tend to have quite powerful second components representing around 25% of the variance (e.g. Crime, Unemployment). In this analysis, I test two components for all issues who have an eigenvalue greater than 1; for all other issues I use a single component to represent the public index.

The second set of columns report how well the components capture the variance within each variable. While magnitude of the coefficient cannot be measured across issues or variables, the direction can be. Accordingly, if three of the variables have a positive coefficient while the fourth has a negative coefficient, it suggests that

the underlying trend that drives the variance in the first three components is not present in the final one. There are no instances in which the first component does not report a positive coefficient from at least three of the variables; of those that variables not included on some issues, it is most frequently Wikipedia or Blogs. The second component's coverage is less consistent, with the tests reporting negative components anywhere from 8 issues for Twitter up to 16 issues for Wikipedia. Patterns also emerge in how variables tend to co-vary. While there are many ways to slice these results, perhaps the most interesting is that when Twitter is not explained well by the second variable, Blogs or Google frequently is not either. Wikipedia seems to be more independent.

The lack of uniformity across variables, as well as the sometimes minimal proportion represented by the first component, warrant not just the use of the second component when appropriate, but also the inclusion of each subsidiary measure. Accordingly, the time series models of these data include tests of the relationship of each variable with mass media as well as the broad public index.

Time Series Analysis

Tables 2.2 and 2.3 show the results of the time series analysis for each issue, with Table 2.2 showing the results with mass media as the influencer and Table 2.3 showing the results when the public is the influencer. There are 10 columns for each issue. The left side of the dividing line shows the results from tests of mass media's influence over the public while the right side of the line shows the results of tests of the public's influence over the mass media. Each set of directional tests is further

distinguished by the type of public attention measured. The first test for each set uses the public index, determined by the principal components analysis above, while the remaining four columns demonstrate the role of Twitter, blogs, Google searches, and Wikipedia, respectively, with each results in a new column. There are at least two rows for each issue. The first row reports the F-statistic of the Granger causality test as well as the significance level; those issues that called for the use of two components for the public index report both values. The second row(s) for each issue report the most parsimonious lag structure, as determined by the AIC test.[3] The public lag structure is indicated by some variant of "P-0M1D," with P- indicating that it is the lag structure of the current public variable, 0M indicating the long-term lag structure (from 0-3M), and 1D indicating the short term lag structure (from 1-7D). The mass media lag structure uses a similar format, with the exception that it is prepended with "M-" instead of "P-".

[3] As described above, the AIC test finds the most parsimonious model by minimizing the standard error across each model. Several alternate tests could be utilized, such as the Bayes Information Criterion (BIC), but the AIC is generally the most utilized approach (Enders, 1995).

Table 2.2 ARIMA Results – Mass Media as Influencer

Issue	F-Stat (Time) Public (All)	F-Stat (Time) Twitter	F-Stat (Time) Blogs	F-Stat (Time) Google Searches	F-Stat (Time) Wikipedia
Social					
Abortion	3.69 **	11.49 ***	13.16 ***	6.90 ***	1.89
	(P-3M7D M-1M3D)	(P-0M7D M-0M3D)	(P-0M6D M-0M1D)	(P-0M7D M-3M7D)	(P-0M6D M-1M7D)
Healthcare Reform	4.05 ***	13.19 ***	16.52 ***	8.06 ***	15.06 ***
	(P-3M6D M-2M7D)	(P-3M6D M-0M7D)	(P-0M7D M-0M7D)	(P-0M3D M-3M6D)	(P-2M3D M-1M6D)
Race	4.54 * / 1.99 *	11.23 ***	18.40 ***	1.21	0.03
	(P-3M3D M-0M1D)	(P-0M2D M-0M1D)	(P-0M5D M-0M2D)	(P-3M3D M-0M2D)	(P-0M6D M-0M1D)
	(P-3M7D M-0M7D)				
Reproductive Rights	14.32 ***	26.08 ***	27.94 ***	3.06 ***	15.07 ***
	(P-3M5D M-1M3D)	(P-0M3D M-0M3D)	(P-0M6D M-0M3D)	(P-0M7D M-3M7D)	(P-0M1D M-0M2D)
Same Sex Marriage	31.15 ***	30.38 ***	41.63 ***	20.69 ***	34.96 ***
	(P-3M2D M-0M3D)	(P-0M2D M-0M3D)	(P-0M3D M-0M2D)	(P-3M7D M-0M3D)	(P-0M1D M-0M1D)
Environmental					
Climate Change	3.19 *	9.37 ***	1.78	5.71 ***	25.12 ***
	(P-3M7D M-1M2D)	(P-2M7D M-0M5D)	(P-1M7D M-0M5D)	(P-1M7D M-2M7D)	(P-0M4D M-0M1D)
Fracking	0.36	2.95	2.35	1.54	2.21
	(P-3M7D M-3M1D)	(P-0M7D M-0M1D)	(P-0M7D M-0M1D)	(P-0M6D M-3M1D)	(P-0M1D M-0M1D)
Entitlements					
Medicare	15.60 ***	34.50 ***	92.19 *	9.20 ***	6.53 ***
	(P-3M7D M-2M7D)	(P-0M2D M-0M2D)	(P-0M7D M-0M1D)	(P-3M7D M-0M7D)	(P-0M7D M-3M7D)
Social Security	11.52 ***	8.38 ***	76.34 ***	4.08 ***	10.70 ***

	(P-3M7D M-0M4D)	(P-0M5D M-0M5D)	(P-0M5D M-0M1D)	(P-3M7D M-0M7D)	(P-0M6D M-0M4D)
Welfare	1.83 / 0.26	5.42 *	0.00	1.94	2.03
	(P-3M7D M-3M1D)	(P-0M1D M-0M1D)	(P-0M7D M-0M1D)	(P-0M7D M-3M1D)	(P-0M1D M-0M1D)
	(P-3M7D M-0M1D)				
Economic					
Deficit	6.40 ***	34.48 ***	16.99 ***	3.75 **	10.43 ***
	(P-3M6D M-0M7D)	(P-0M2D M-0M2D)	(P-0M7D M-0M6D)	(P-0M7D M-3M2D)	(P-0M7D M-0M4D)
Inequality	4.51 ***	1.46	6.62 ***	4.89 ***	3.7
	(P-3M7D M-3M7D)	(P-0M1D M-0M1D)	(P - 0M7D M-1M6D)	(P-2M7D M-3M7D)	(P-0M7D M-0M1D)
Taxes	4.09 ***	3.45	11.56 ***	3.39 **	2.54 *
	(P-3M7D M-3M6D)	(P-0M7D M-0M1D)	(P-0M7D M-3M7D)	(P-0M7D M-3M1D)	(P-0M7D M-0M6D)
Unemployment	5.34 *** / 10.10 ***	1.61	6.38 ***	4.43 ***	16.98 ***
	(P-3M7D M-0M5D)	(P-1M7D M-3M2D)	(P-3M7D M-2M7D)	(P-0M7D M-3M6D)	(P-0M1D M-0M4D)
	(P-3M7D M-2M7D)				
Law and Order					
Crime	0.03 / 2.71	2.91 *	3.50 *	2.24 *	4.57 *
	(P-3M7D M-0M1D)	(P-0M7D M-0M4D)	(P-3M7D M-2M1D)	(P-3M7D M-0M7D)	(P-0M1D M-0M1D)
	(P-3M7D M-0M2D)				
Drugs	3.21 * / 0.65	0.30	3.05 *	0.84	3.79
	(P-3M3D M-0M2D)	(P-0M6D M-0M1D)	(P-3M7D M-1M3D)	(P-3M7D M-0M1D)	(P-0M6D M-0M1D)
	(P-3M7D M-0M1D)				
Gun Control	7.96 ***	13.63 ***	37.05 ***	18.02 ***	48.50 ***
	(P-3M2D M-1M4D)	(P-0M3D M-0M2D)	(P-0M4D M-0M4D)	(P-3M7D M-0M7D)	(P-0M2D M-0M4D)
Immigration	4.40 **	0.11	11.33 ***	3.80 ***	2.1
	(P-3M7D M-2M1D)	(P-0M5D M-0M1D)	(P-0M7D M-0M7D)	(P-0M7D M-3M7D)	(P-0M1D M-0M1D)
Foreign Policy					
Afghanistan	1.24	2.10	6.50 ***	5.12 ***	7.52 ***
	(P-3M1D M-1M1D)	(P-0M1D M-0M1D)	(P-1M7D M-0M7D)	(P-3M7D M-1M6D)	(P-0M1D M-0M2D)

Iraq	2.81 *	7.17 **	7.80 ***	7.58 ***	12.28 ***
	(P-3M1D M-3M1D)	(P-0M3D M-0M1D)	(P-1M7D M-0M7D)	(P-3M7D M-3M6D)	(P-0M3D M-0M3D)
Terrorism	16.83 ***	2.89 *	10.82 ***	0.01	8.04 ***
	(P-3M1D M-1M1D)	(P-1M2D M-3M1D)	(P-0M4D M-0M3D)	(P-3M5D M-0M1D)	(P-3M1D M-1M1D)
Arab Spring	14.25 ***	1.62	73.02 ***	5.14 ***	1.77
	(P-3M4D M-2M1D)	(P-0M6D M-0M1D)	(P-0M6D M-0M1D)	(P-3M7D M-3M6D)	(P-0M3D M-1M1D)
Other					
Labor	5.31 ***	9.98 ***	13.52 ***	1.19	5.97 *
	(P-3M7D M-3M7D)	(P-0M4D M-0M3D)	(P-0M7D M-0M7D)	(P-1M7D M-3M1D)	(P-0M1D M-0M1D)
Education Reform	3.36 **	11.48 ***	7.05 ***	7.51 **	6.13 *
	(P-3M7D M-0M6D)	(P-0M1D M-0M1D)	(P-0M7D M-0M7D)	(P-3M7D M-0M1D)	(P-0M1D M-0M1D)
Net Neutrality	5.41 ***	43.89 ***	51.87 ***	5.55 ***	5.74 *
	(P-1M1D M-3M3D)	(P-0M3D M-0M1D)	(P-0M3D M-0M1D)	(P-1M1D M-3M3D)	(P-0M1D M-0M1D)
*** < 0.001	** < 0.01	* < 0.05			

Table 2.3. ARIMA Results - Public as Influencer

Issue	F-Stat (Time) Public (All)	F-Stat (Time) Twitter	F-Stat (Time) Blogs	F-Stat (Time) Google Searches	F-Stat (Time) Wikipedia
Social					
Abortion	22.85 *** (M-0M1D P-0M1D)	11.33 *** (M-0M3D P-0M2D)	35.52 *** (M-0M1D P-0M1D)	13.94 *** (M-0M1D P-0M1D)	1.86 (M-0M1D P-0M1D)
Healthcare Reform	0.27 (M-0M6D P-0M1D)	2.78 *** (M-0M7D P-0M7D)	5.27 *** (M-0M7D P-0M7D)	5.57 *** (M-0M7D P-0M6D)	11.48 *** (M-0M6D P-0M1D)
Race	45.92 *** / 4.25 * (M-0M5D P-0M1D) (M-0M5D P-0M1D)	40.62 *** (M-0M5D P-0M1D)	7.64 *** (M-0M5D P-0M5D)	4.99 *** (M-0M5D P-0M5D)	0.29 (M-0M5D P-0M1D)
Reproductive Rights	63.43 *** (M-0M3D P-0M1D)	17.64 *** (M-0M3D P-0M2D)	10.06 ** (M-0M3D P-0M1D)	43.46 *** (M-0M3D P-0M4D)	17.17 *** (M-0M3D P-0M1D)
Same Sex Marriage	1.08 (M-0M1D P-0M1D)	24.25 *** (M-0M2D P-0M2D)	9.42 *** (M-0M2D P-0M2D)	14.73 *** (M-0M2D P-0M2D)	2.46 (M-0M1D P-0M1D)
Environmental					
Climate Change	50.60 *** (M-1M6D P-0M1D)	15.32 *** (M-1M6D P-2M6D)	7.09 *** (M-1M7D P-2M5D)	16.66 *** (M-2M6D P-0M5D)	0.70 (M-1M6D P-0M1D)
Fracking	4.57 * (M-0M1D P-0M1D)	1.75 (M-0M1D P-0M4D)	3.29 ** (M-0M1D P-0M7D)	2.61 * (M-0M1D P-0M7D)	7.12 ** (M-0M1D P-0M1D)
Entitlements					
Medicare	1.18 (M-0M2D P-0M1D)	1.73 (M-0M2D P-0M1D)	0.15 (M-0M2D P-0M1D)	7.71 *** (M-0M2D P-0M2D)	3.00 (M-0M2D P-0M1D)
Social Security	2.83 (M-0M4D P-0M1D)	6.12 *** (M-0M4D P-0M5D)	3.98 ** (M-0M4D P-0M4D)	11.13 *** (M-0M6D P-0M6D)	1.3 (M-0M4D P-0M1D)
Welfare	3.88 * / 27.95 *** (M-0M1D P-0M1D) (M-0M1D P-0M1D)	5.16 * (M-0M1D P-0M1D)	27.11 *** (M-0M1D P-0M1D)	0.31 (M-0M1D P-0M1D)	1.52 (M-0M1D P-0M1D)
Economic					
Deficit	6.16 * (M-0M4D P-0M1D)	14.97 *** (M-0M4D P-0M3D)	6.50 *** (M-0M3D P-0M4D)	0.13 (M-0M3D P-0M1D)	5.02 * (M-0M4D P-0M1D)

Inequality	1.97	3.50 **	5.75 ***	4.75 ***	16.91 ***
	(M-0M5D P-0M1D)	(M-0M5D P-0M4D)	(M-0M4D P-0M4D)	(M-0M4D P-0M4D)	(M-0M4D P-0M1D)
Taxes	4.04 *	12.13 **	9.53 ***	11.44 ***	4.14 *
	(M-0M5D P-0M1D)	(M-0M5D P-0M2D)	(M-0M5D P-0M6D)	(M-0M5D P-0M3D)	(M-0M5D P-0M1D)
Unemployment	1.68 / 52.72 ***	4.98 ***	13.85 ***	14.62 ***	6.85 **
	(M-0M6D P-0M1D)	(M-0M6D P-0M6D)	(M-0M5D P-0M7D)	(M-0M6D P-0M5D)	(M-0M3D P-0M1D)
	(M-0M3D P-01MD)				
Law and Order					
Crime	12.09 *** / 18.35 ***	9.16 ***	7.31 ***	5.88 ***	2.81
	(M-0M7D P-0M1D)	(M-0M7D P-0M4D)	(M-0M7D P-0M2D)	(M-0M7D P-0M7D)	(M-0M7D P-0M1D)
	(M-0M7D P-0M1D)				
Drugs	1.16 / 0.21	2.11	0.00	0.64	0.07
	(M-0M1D P-0M1D)	(M-0M1D P-0M1D)	(M-0M1D P-0M1D)	(M-0M1D P-0M1D)	(M-0M1D P-0M1D)
	(M-0M1D P-0M1D)				
Gun Control	152.13 ***	50.18 ***	36.12 ***	8.32 ***	73.69 ***
	(M-0M3D P-0M1D)	(M-0M5D P-0M6D)	(M-0M5D P-0M5D)	(M-0M3D P-0M2D)	(M-0M3D P-0M1D)
Immigration	37.00 ***	27.54 ***	22.59 ***	10.17 ***	0.73
	(M-0M3D P-0M1D)	(M-0M3D P-0M2D)	(M-0M3D P-0M1D)	(M-0M3D P-0M3D)	(M-0M3D P-0M1D)
Foreign Policy					
Afghanistan	0.13	4.17 *	1.97	2.25	0.02
	(M-0M1D P-0M1D)	(M-0M4D P-0M2D)	(M-0M4D P-0M2D)	(M-0M4D P-0M4D)	(M-0M1D P-0M1D)
Iraq	10.86 ***	10.56 ***	23.57 ***	15.50 ***	1.67
	(M-0M1D P-0M1D)	(M-0M4D P-0M3D)	(M-0M1D P-0M1D)	(M-0M1D P-0M3D)	(M-0M1D P-0M1D)
Terrorism	0.26	0.04	0.13	9.50 **	1.73
	(M-0M1D P-0M1D)	(M-0M1D P-0M1D)	(M-0M1D P-0M1D)	(M-0M1D P-0M1D)	(M-0M1D P-0M1D)
Arab Spring	84.49 ***	22.59 ***	16.44 ***	20.11 ***	1.98
	(M-0M1D P-0M1D)	(M-0M1D P-3M7D)	(M-0M1D P3M1D)	(M-0M1D P-0M1D)	(M-0M1D P-0M1D)
Other					
Labor	77.21 ***	47.54 ***	48.29 ***	11.27 ***	4.51 *
	(M-0M4D P-0M1D)	(M-0M4D P-0M2D)	(M-0M4D P-0M1D)	(M-0M4D P-0M2D)	(M-0M4D P-0M1D)
Education Reform	7.79 **	3.68	4.63 *	6.52	4.78 *
	(M-0M1D P-0M1D)	(M-0M1D P-0M1D)	(M-0M1D P-0M1D)	(M-0M1D P-0M1D)	(M-0M1D P-0M1D)
Net Neutrality	1.95	11.95 ***	7.42 ***	1.98	0.00
	(M-0M1D P-0M1D)	(M-0M1D P-0M4D)	(M-0M1D P-0M3D)	(M-0M1D P-0M1D)	(M-0M1D P-0M1D)
	*** < 0.001	** < 0.01	* < 0.05		

One of the factors that distinguish this analysis from Neuman, et al. (2014) is the recognition that the dynamics underlying the relationship between the mass media and the public is not stable across issues. Indeed, the variance in lag structures across issues and elements within each issue demonstrates the faultiness of their approach: by artificially constraining the lag structure and applying it uniformly across all issues, these authors do not account for the different dynamics of each issue, which may result in impulse response functions that are distorted by the introduction of statistically unimportant lags. Of course, Neuman, et al. did not employ impulse response functions, so their analysis was unable to address this potential problem (see Chapter 3).

Figure 2.1 Monthly lags (Mass Media influencing public)

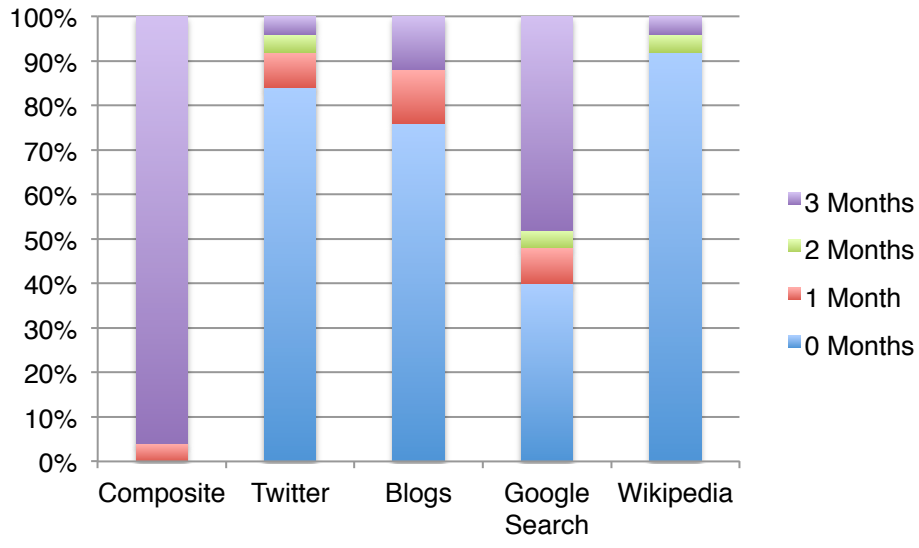
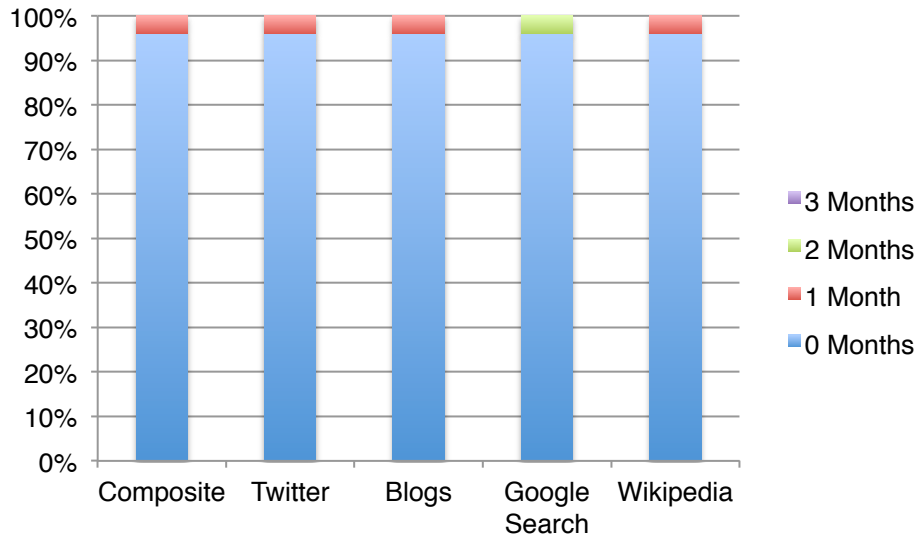


Figure 2.2 Monthly lags (Public influencing mass media)



Some other trends emerge from this analysis. Without taking into consideration statistical significance, when the mass media is the influencer, it influences the composite public index over the long term more frequently than it does not. The inverse is not true, however: when the public is the influencer over the mass media, that influence tends toward the short term. Similarly, looking at each public agenda measure, the results differ greatly. When the media is the influencer, the individual measures tend toward a stronger influence in the short term, as shown in Figure 2.1. The same is true, but stronger, when the public is influencing the mass media, as shown in Figure 2.2.

Hypothesis 1, which suggested that there will be multi-directional causality across issues, is held up by these results. Looking just at the public index variable, there is bi-directional agenda setting as measured at the $p < 0.05$ level evident in about two thirds of issues; with no public influence over the mass media for same sex

marriage, social security, inequality, drugs, terrorism; no mass media influence over the public on crime or welfare, and a lack of influence in either direction for Afghanistan. However, for almost all of these issues, other measures of the public show influence. For instance, the mass media is influential over the public at the .05 level for all other variables while the public is influential over the mass media for all variables except for Wikipedia. Similarly, the mass media influences blogs, Google searches and the public on the Afghanistan issue, but only Twitter influences the mass media on this issue. There is only one instance of significance for drugs, which is significant at the .05 level for just the first component of the public index for mass media influence, and shows no significant influence of the public over the mass media. Afghanistan and Medicare have a similar structure. Fracking, on the other hand, demonstrates the opposite effect, with no mass media influence over the public, but public influence over the mass media for all indicators except Twitter. This suggests that this issue might not receive any attention in the mass media if not for the effort of the public. Finally, some issues, like gun control and reproductive rights show bi-directional influence across all measures of the public, while several issues demonstrate causality for a majority of issues.

The most consistent bi-directional influence seems to occur in the Social Issues category, where Twitter and blogs are influential in both directions, with Google searches and Wikipedia showing limited levels of influence. On the other hand, with the exception of Gun Control, Law and Order Issues are the least consistently bi-directional issues. There may be a logical explanation for this,

grounded in agenda setting theory, which finds that obtrusive issues, or those with which the public encounters on a day to day basis, are least likely to exhibit agenda setting effects (Neuman, 1990; Winter & Eyal, 1981; Zucker, 1978). Moreover, social issues are often broad, nationally focused phenomenon, whereas discussions of crime and drugs are often more local. Accordingly, the broader issues within the law and order category, like gun control and immigration, show a higher number of statistically significant interactions.

Previous research has shown that foreign policy issues are particularly susceptible to agenda-setting effects from the media because the public has no frame of reference for interactions with foreign nations (McCombs, 2004; Wanta, Golan, & Lee, 2004). Additionally, many of the events that drive coverage of these issues are dramatic - bombings, elections, etc. – which rivet attention from the public, drive the media into alarm mode, and buoy traditional agenda setting influence (Birkland, 1998); often, there are no events to presage this attention. Accordingly, one would expect limited influence from the public to the mass media and extensive influence of the mass media over the public, yet this is really only the case for terrorism and Afghanistan, whereas Iraq and Arab Spring show bi-directional influence. It is difficult to hypothesize why this pattern emerges, however the Iraq results may be a consequence of the longstanding presence of this nation in American foreign policy and the continuing relevance of events there to foreign policy decisions. Additionally, the limited influence of the media over the public on the Arab Spring issue likely reflects the extent to which protestors and supporters utilized that medium.

The patterns of each variable are also interesting. Blogs seem to be more frequently responsive to media effects than other variables. Blogs have a similarly more frequent impact on the mass media than other public variables, although the difference between the number of issues for which blogs, Twitter and Google searches are influential is minimal. Wikipedia is least frequently influential over the mass media. Again, it is difficult to characterize the underlying dynamics of these results, but it could stem from the accessibility of the mediums and the needs of them. Political bloggers may be the most informed or politically motivated segment of the public, so they may be likely to be responsive both to other bloggers and to the mass media as a consequence. Accordingly, journalists and editors may read commentary on their articles or on issues with which they are concerned. Tweets, on the other hand, are obviously much shorter, and may therefore just be a link and some brief commentary. They could be similarly influential because many news organizations track metrics on the stories they publish; the virality of Twitter in spreading links propels its agenda setting capacity.

The responsiveness of Google search trends and the more limited responsiveness of Wikipedia pageviews could be emerging because people are less likely to actively search on issues relating to those in the news; in other words, when people read about events in the mass media, they may not be inclined to seek more information online, instead being satisfied by the information contained in the article. Alternately, people may be more familiar with longer term or less complicated issues; people may understand and hold established views on social issues such as abortion

or race. In the other direction, Google searches frequent influence may reflect mass media responding to searches that lead people to their articles.

Hypothesis 2 proposed that agenda setting effects would persist for longer than just a week. This analysis examined bi-directional agenda setting effects at two levels: in the short-term, effects that linger for one to seven days, and, in the long-term, effects that take up to three months to decay. Hypothesis 2a, which addresses the influence of the mass media over the public, is supported by these results. Nearly every issue exhibit long term effects; only race, same sex marriage, deficit, and education reform, show no evidence of long-term effects.

Hypothesis 2b, which suggested the opposite effect – a long term impact of the public on the media – was not shown to be true, with the sole exception of Arab Spring. Arab Spring's results are unsurprising, as this event was made possible in part by an explosion of online activity. However, the lack of evidence for public influence over the mass media in the long term may reflect the structural nature of the media itself, which often does not linger in patrol mode for long (Boydstun, 2013).

Conclusion

This study tested agenda setting effects across the media ecosystem in the modern era, which is characterized by an active and vocal public, 24 hour news cycles, and a proliferation of news avenues for interaction between the mass media and the public. Contrary to long-standing views of agenda setting, and in line with some more recent studies, there is considerable bi-directional agenda interaction between the mass media and the public. Consequently, the mass media has become in

some ways more responsive to public opinion than it was in the earlier era. However, the nature of these effects is dependent upon the issue in question, with even some topically similar issues exhibiting different patterns.

Additionally, this study showed that the effects of the mass media may linger for several months, depending on the issue. In these instances of heightened attention, when events related to the issue at hand emerge, they receive more attention than they would otherwise, and may help agenda setting effects persist for longer than they would otherwise. This is a consequence of the alarm/patrol modes of the mass media as well as priming effects on the public.

While this study demonstrates the broad dynamics within the mass media/public ecosystem, they do not show how those effects occur or how unified the mass media agenda is. These questions will be addressed in later chapters.

Chapter Three:
The Causal Pathways of Attention

Chapter 2 explored the system-level interaction between the public and the mass media. As the results show, there are several causal pathways and lines of interaction, but a few patterns do emerge. This chapter organizes the issues into a limited typology and outlines some of these interactions. This is done in two ways. First, I explain the context in which the issue rests: the issue environment, including the actors involved and the parameters of the debate, as well as how the influence between the public and the mass media unfolded within the constraints of a specific time period. Second, I use an impulse response function to demonstrate how mass media and the public influence each other in the average period. I select the issue and the time period to be the most canonical examples. In the typology presented below, I present all possible scenarios and illustrate the most common scenarios with examples drawn from real world issues.

Issue Activation Typology

Soon after agenda setting theory drew research attention, scholars noted that the agenda setting effect differed by issue. Eyal, for instance, initially found no agenda setting effect because the lack of agenda setting in some issues obscured the effects of other issues (unpublished research discussed in Winter et al., 1982). Agenda setting, in other words, cannot be measured effectively in the aggregate but needs to be broken down by issue (Winter et al., 1982).

If the public and media agendas interact differently depending on the issue at hand, then some characteristic of the issue may be part of the reason. As early as Zucker (1978), communication scholars have recognized an issue's obtrusiveness to be a primary factor in mitigating the agenda setting effect. Obtrusiveness describes the presence of an issue in the average person's life, meaning that if an issue regularly and directly impacts people, increased attention in the media will not raise that issue's salience. Agenda setting, then, is more effective when it is able to draw attention to, and provide more information about issues that the public would not normally consider (Atwater et al., 1985; Zucker, 1978).

Some studies have found conflicting results, however, with the media increasing an issue's salience among the public even when it is obtrusive (Behr & Iyengar, 1985; Demers, Craff, Choi, & Pessin, 1989; Erbring, Goldenberg, & Miller, 1980). Furthermore, Erbring, et al. point out that real world conditions matter even if an issue isn't particularly obtrusive. In particular, they point to interpersonal communication as a key mitigating factor of agenda setting (1980). There has also been considerable inconsistency in defining which issues are obtrusive, as the decisions regarding which issues are obtrusive are often made by the researcher (Demers et al., 1989).

Other factors may shape audience reaction, although they have not received the level of attention that obtrusiveness has in the literature. Some scholarship has pointed to factors such as the dramatic nature of an issue as intrinsic to the agenda setting effect, as the public is transfixed by the media's coverage of that issue

(Birkland, 1998; MacKuen & Coombs, 1981). Wars, terrorism attacks, and other kinds of vivid, conflict-laden events fit this category. Additionally, Yagade and Dozier found that abstract issues were less susceptible to agenda-setting effects than concrete issues (1990). Both of these ideas were confirmed in some respect by Wanta and Hu, at least as they concern international issues (Wanta & Hu, 1993).

Other scholarship has attempted to define an agenda setting typology according to the substantive emphasis of the issue and the relationship between the public and the media. Neumann developed a typology of issues according to the responsiveness of the public to media coverage, which would vary not just on the type of issue but also across the lifecycle of attention to the issue. In his view, there were four issue categories: crises, which had clear beginnings, middle periods, and ending periods that defined the attention of the media and public; symbolic crises, which were consistent problems across time that would be elevated to the level of crisis for a short period when the media could strongly influence the public agenda; problems, which were "continuing concerns" that would slowly fluctuate in attention – but for which the public would be highly responsive to media coverage; and non-problems, which were issues that had low levels of public concern but occasionally high levels of media concern (Neuman, 1990). Drawing on this kind of attention-based typology, Soroka defined issues as either prominent, long-lasting issues that were important to the public at large; sensational issues that drew considerable media attention, governmental issues such as the public debt or taxes that were cyclical in

nature; and valence issues, which were long-lasting social issues (such as racism) that had largely one-sided portrayals in the media (2002).

Theories of issue differences in agenda-setting have accordingly shifted from an analysis of generic issue attributes (obtrusiveness, dramaticness, abstractness) to typologies that emphasize the importance of the public-media relationship and intrinsic substantive characteristics of the issues themselves. This allows for more expansive theory-building in the modern media era because it expressly incorporates interactivity into the analysis. Certain issues are by their very nature more likely to draw notice because they come to the attention of the public in the aftermath of a critical, dramatic event. Other issues are of high obtrusiveness to the public, but the media may ignore them except for periodic bursts of attention. In contrast, some issues are primarily the province of the media, the elite, or a dedicated issue public and therefore do not receive much attention outside of those groups. In all of these situations, the public and the media co-exist in a hybridized media environment and therefore continuously interact; at times this interaction is driven on the part of the public by some politically-motivated individuals or organizations who can, in some instances, draw media and in turn public attention to the issue.

In many ways, how the issue is activated across the public and the media agendas becomes more important to this analysis than the issue itself. A critical or dramatic event can be a war, but it could also be a protest about, say, reproductive rights. Moreover, characteristics like an issue's obtrusiveness or its concreteness can

change over time. For instance, an abstract issue like climate change may become more concrete at the end of a long, hot, dry summer.

Accordingly, this typology is centered around how the issue is activated rather than the issue itself. Certain issues will generally be activated via consistent processes, but this approach allows for this variance and focuses attention on interaction, which facilitates agenda setting. Additionally, this theoretical construct breaks from the traditional agenda-setting approach of expecting a media to public process: the hybridized, interactive environment lends agency to individuals across power structures (Chadwick, 2013). Nonetheless, a single tweet or blog post is not enough to sway agendas toward a new issue; instead, some kind of threshold needs to be reached before this kind of attention shift occurs. This threshold could be reached through increased media attention just as easily as it could be a cacophony of social media; most likely, this swell of attention will develop simultaneously across mediums but will take different shapes, in terms of the rise and fall of attention, and be directed by different types of actors.

Accordingly, I suggest several different types of interaction and activation. First, this is broken down along interaction: no interaction, one-way influence, and bi-directional interaction. Second, I distinguish between different sources of interaction: mass media or public, with several potential different sub-sets guiding this.

No Interaction. Agenda interaction between the mass media and the public on these issues may occur in discrete periods, but it is inconsistent across the time studied, as measured by the statistical tests in Chapter 2. Issues consistent with this

pattern could be elite-driven, holding little salience for the public or which are obtrusive to the public and thus makes the public resistant to agenda setting effects; or they could be the reverse: widespread public issues for which the elites are unaware or unconcerned.

One-Directional: Media Activation. This is the classic agenda setting scenario, in which the media is the first to start attending to an issue at a higher rate, and their demonstrated interest draws in the public.

One-Directional: Public Activation. These issues are what McCombs calls reverse agenda setting, in which media starts attending to an issue following cues from the public (McCombs, 2004). These issues are classic reverse agenda-setting issues, in which the public is broadly concerned about a policy because it is obtrusive and concrete, but it lacks much of the drama or other qualities that will make the media notice in a concerted manner. In such instances, media attention will likely start as small, tepid responses to broad public attention, but expand as the issue becomes more salient for an even broader cross-section of the public. That does not mean, however, that the media is guaranteed to notice this public concern; instead, the issue could languish for years without significant media attention. Economic or local issues that are obtrusive to the public are likely to constitute much of this category. For instance, the Occupy Wall Street movement capitalized on the latent public concern over economic inequality, a topic the media had largely ignored prior to the movement's arrival. Because these topics start with public concern, media attention to the issue will likely wane before public attention does.

One Directional – Public Activation (Entrepreneur). Entrepreneur issues are similar to public issues, but the source of agenda-setting and the mechanism mediating the public-media interaction differs. Although an entrepreneur issue may reflect broad concern, the media attends to the issue only after a concerted campaign by Dreier's opinion entrepreneurs activates a broader issue public, whose attention in turn pressures the media to attend to the issue. The obtrusiveness or abstraction of the issue are of less importance than the effectiveness of these entrepreneurs in activating these issue publics. Once the public and media are activated, they will interact, but because this is not a deeply rooted issue, the public may move on quickly while the media remains caught up in an interactive political discussion driven and dominated by those entrepreneurs. Of course, these entrepreneurs are consistently trying to draw attention to a cause. It is unclear when these efforts will succeed or fail, and will likely be a result of either changes in tactics or exogenous changes in the media environment. Social or polarizing issues are the most likely issues in this category. This category is the most difficult to observe, although it is most likely in expressive measures of the public, such as blogs or Twitter, rather than behavioral measures like Google searches and Wikipedia pageviews.

In fact, it is quite possible that these two categories should be subsumed: that absent of media coverage, public attention to an issue does not galvanize until it is organized by some activist organization. In this telling, public concern, even when widespread, is unfocused, so there is no story for the media to cover. Accordingly, this widespread public support remains unnoticed, and the issue remains in the No

Interaction category. With this caveat, I am going to leave the two categories distinct in the hope that future research can explore this relationship.

Bi-Directional: Mutual Activation. Such issues are characterized by the continual interaction between the mass media and the public. Moreover, this influence is compounding: as the public becomes more interested in an issue, it will demand more information from the media; this increased media attention will cause more of the public to notice. These interlinkages may develop and wane quickly.

Bi-Directional: Crisis Activation. Much like Neuman's crises or MacKuen's dramatic events, these are issues that are activated quickly in response to a dramatic, usually observable event. It is often obtrusive and concrete. Violent conflict like terrorist attacks and war are likely to drive these. Attention in the public and media agendas will likely be very quick, and feature high levels of interaction between the two spheres, as the public digests, theorizes and comments on on-the-scene reporting, followed by incorporation of that discussion in future coverage. A prime example of this interaction is the aftermath of the Boston Marathon Bombing of April 22, 2013, in which members of the public almost immediately scoured photos of the event; pictures of commonly identified (although incorrect) potential suspects were splashed across newspaper covers the following day (Chittum, 2013). In some instances, the media will continue to attend to this issue longer than the public.

A few clarifications are required. None of this is to suggest that there is complete rigidity either in the issues associated with each category or the presence of just one activation process at a given time. For instance, at a given time an issue may

be activated according to processes exclusive to a crisis or an entrepreneurial activation. However, it will likely fit one category better, and ensuing analysis will benefit from these distinctions. Additionally, there are other constraints that can limit this interaction, such as agenda congestion, the proximity to elections, policymaker attention, and the diversity of discussion in the media (Boydstun, 2013); these are beyond the scope of this study, as are other exogenous factors that drive media attention (such as politicians). Finally, this reflects a potential change in how scholars think about agenda-setting: because of the new impermanence of agendas, it may be more appropriate to discuss agenda-setting in terms of attention shifting or agenda swaying, with an eye toward the process of activation and the interactivity of actors as key.

Methods

There are two parts to the subsequent analysis. First, I categorize each issue according to the typology above. Second, I select several issues to use as case studies. Within each case study, I first explain the context of the issue as well as the media environment itself. This helps explain how the interaction occurs: how long it takes for one party to pick up the issue, and any persisting or reverse influence. This is conducted through searching the archive of Tweets, blog posts, and mass media articles collected as part of this research, and turning to other research where available. This research is confined to a short time window, as describing the particulars of an issue over the course of four years is a book-length project on its own.

I then show the typical interaction between the mass media and the public through custom-made impulse response functions. Based on the most parsimonious model selected in Chapter 2, an impulse response function simulates a shock to the environment as the mass media and the public register it and then decays as attention returns to normal. One way to think about this is to view it as simulating a major event, which could be a terrorist attack, passage of a major bill, or simply protests relating to an issue. After initial attention is drawn toward the issue, the impulse response function demonstrates how attention will rise and then fall, including times in which it will first fall and then rise, plateau, or other situations.[4] Moreover, with an impulse response function, one can simulate the interaction between the mass media and the public. So, for instance, if attention rises first in the public (the public variable is shocked), an impulse response function can show how that public attention influences (or doesn't influence) the mass media (Hamilton, 2004a).

In an impulse response function, the amount of attention on a given day is a calculation of the coefficients from the most parsimonious model for that day multiplied by the amount of attention on the appropriate number of lagged days. Accordingly, if the most parsimonious model includes 3 public lags and 4 media lags, for the current day, the model will multiply the coefficient of day 1 for the public variable by the previous day's attention measure plus a similar multiplication of day 2's coefficient and the public attention from two day's prior, and so on. The same

[4] Typically, an impulse response function is run after a vector autoregression (VAR) analysis, which includes the co-variance of the variables in the system. For a number of reasons, a VAR analysis was not conducted here. Consequently, the assumption is that effects take one day to manifest, which may be reducing the level of interaction between the public and the mass media.

occurs for media variables. Consequently, the amount of attention in an impulse response function after the system is shocked (it uses real world data up to that point) is the sum of attention in previous days, as specified by the appropriate model, multiplied by the coefficients from that model. The results of the shocked system are then subtracted from those of an unshocked system, and this difference is plotted as a percentage of the value shocked (Hamilton, 2004a).

In this analysis, the shock value is the mean of the system (ie. the mean attention on Twitter for the issue across the entire time period), although the standard deviation or any other value can be used – larger values such as the mean will simply highlight any changes. Once the mean was calculated, I selected a 90 day time period from the collected time series that best exemplifies the trends inherent in the dataset. This constitutes the real data, which the impulse response function uses to simulate subsequent values. I then constructed two simulations using the values from Chapter 2's best fitting models. For example, the most parsimonious model may suggest that Twitter attention on a given day is dependent upon the amount of attention from the past 2 days on Twitter and the preceding one day on mass media. Accordingly, all simulated data is constructed by multiplying the model coefficients by the appropriate preceding day's attention value.

Recall that there are two sets of simulated data, with each set containing data for a measure of the public and the mass media. The first set contains just data simulated according to the model. In the second set, I shock the system using the value specified above. I then calculate the difference between the two sets. This is the

impulse response. Given the parameters of the model, it shows how changes in attention persist over the following days; sometimes this is just an immediate drop off, while at others it plateaus before dropping off or leads to cyclical patterns of attention. The plots that are included show these changes as a percentage of the value that is shocked. I conducted all of this analysis in Excel so that I could verify visually that the results were calculating correctly.

Typology Results

Table 3.1 categorizes the issues analyzed in Chapter 2 according to this typology. Because there are multiple measures of public attention (Twitter, blogs, Google searches, Wikipedia page views, and 1-2 , and the first component of the four unique measures), and those mediums might diverge in influence, I employ two methods for determining the role of the public. First, if the public to media or media to public measure of that first (or second, if relevant) component (as determined in the PCA test in Chapter 2) is significant (as determined by the Granger Causality tests in Chapter 2), the public is viewed as influential over the media or influenced by the media, respectively. Similarly, if at least three of the unique measures of the public are significant, that issue is included. Accordingly, I am erring on the side of inclusion.

Some additional classification caveats are important. Distinguishing between *One-Directional Public* and *One-Directional Public (Entrepreneurial)* requires a deep dive into several cases to determine the beginning of this interaction. This is outside the scope of this project at this point. Additionally, the distinction between *Bi-*

Directional Mutual Activation and *Bi-Directional Crisis Activation* rests in the pattern of attention. A *Crisis* issue will have several unique, sharp spikes in attention that decay quickly, i.e. attention to this issue will be positively skewed.

Table 3.1. Activation Typology

Activation Type	Issues
No Interaction	Drugs
One-Directional - Media Activation	Medicare, Afghanistan, Net Neutrality, Terrorism
One-Directional - Public Activation	Fracking, Welfare
One-Directional - Public Activation (Entrepreneur)	N/A
Bi-Directional - Mutual Activation	Abortion,* Arab Spring, Climate Change, Crime, Education Reform, Immigration,* Inequality, Iraq,* Race, Social Security, Taxes, Unemployment
Bi-Directional - Crisis Activation	Deficit, Gun Control, Healthcare Reform, Labor, Reproductive Rights, Same Sex Marriage

* Indicates that issue showed some elements of a crisis activation issue, but this was not consistent.

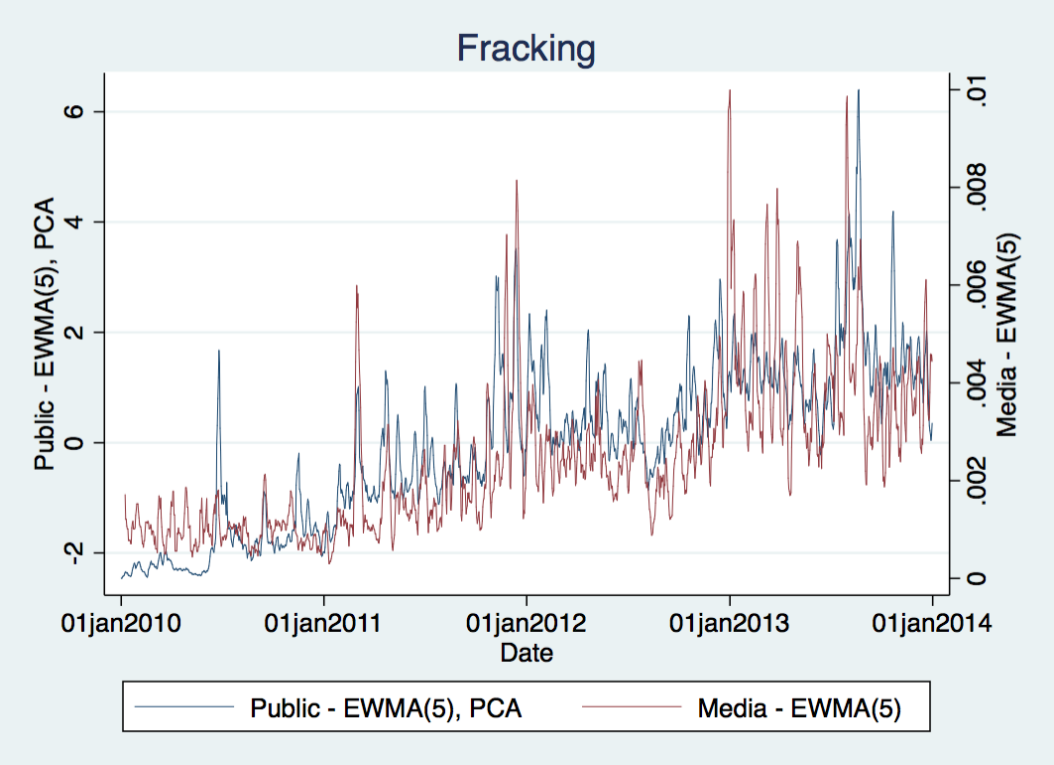
Only one issue exhibits virtually no interaction – Drugs. Several exhibit signs of uni-directional media activation (Medicare, Afghanistan, Net Neutrality, Terrorism) while just two are uni-directional public activation issues (Fracking, Welfare). Accordingly, the majority of issues are bi-directional, with six looking like crises and 12 exhibiting different patterns of activation. Three of those mutual activation issues, Abortion, Immigration, and Iraq, had several crisis episodes, but the overall interaction was more mixed.

Case Studies

The following analysis includes three case studies: a uni-directional public activation issue, a bi-directional general activation issue, and a bi-directional crisis activation. I do not include a case study of a uni-directional media activation issue because it is the classic agenda setting story – any number of previous stories explain this. Instead, I will begin with a uni-directional public activation issue: Fracking, particularly in late 2012, shows how public attention can influence the media. While several of the bi-directional general activation issues could work, I selected Climate Change because of the cyclical nature of attention. Finally, because attention toward Gun Control appears to lurch from crisis to crisis, examination of the early 2011 period after Congresswoman Gabrielle Giffords was shot will show how this interaction occurs. All posts, Tweets, and news articles highlighted are meant to serve as examples of the kind of discussion that occurs.

Uni-Directional Public Activation: Fracking

Figure 3.1. Attention to Fracking



Context. Despite recent attention, hydrofracturing (fracking) is actually an old technique for extracting oil and natural gas from the ground, with documented examples of it as early as the 1860s. The fracking debate generally refers to the process of injecting a mixture of water and chemicals into a fossil fuel deposit in order to build more pressure inside the deposit or change the viscosity of the oil to make it easier to pump out. In either situation, this process makes it easier to pump the fuel out of the deposit. Recent improvements to the process, along with the high energy prices, have made fracking both technologically and economically feasible (Prud'homme, 2013).

Fracking is controversial due to perceived localized and general consequences. In the areas local to the drilling, many have reported contaminated water supplies, a consequence of the hazardous chemicals pumped into the oil deposit. Shocking documentaries like 2010's *Gasland* showed people in areas near where fracking was taking place lighting the water from their faucets on fire. Fracking has also been shown to induce earthquakes (Keranen, et al., 2014; Mazur, 2014; Warner & Shapiro, 2013). At the global level, fracking is part of the ongoing debate about climate change. Because fracking is an energy intensive technique, it not only sends more carbon into the atmosphere when the extracted fuel is burned, but it also burns extra energy during the extraction process(Prud'homme, 2013). Fracking has also been controversial at the legislative level, with several states considering fracking bans, most notably New York. Many of the legislative and judicial battles have come about because of the work of anti-fracking activists (Warner & Shapiro, 2013).

An informal analysis of content on blogs, organized by my statistical findings, shows that blogs were the most statistically significant drivers of media attention during this time period, so much of the remaining analysis will focus on them. The conversation around fracking at this point on blogs seemed to split along two lines: on the one side, there were anti-fracking activists or other opponents, who talked about some of the potential problems with fracking, while supporters tended to promote the economic benefits of the practice. Bloggers opposed to fracking discussed several issues. For example, earthquakes were a key concern after several earthquakes hit the

Dallas area in October, challenging the view from industry that they weren't linked to fracking: "Industry will say fracking doesn't cause earthquakes but that's bull" (reefrelieffounders.com, 2012). My survey of blogs at crucial times also shows that Bloggers also highlighted news articles linking earthquakes in other parts of the world to fracking, most notably in Spain (bluelivingideas.com, 2012). This discussion mostly occurred in October 2012, although when California started to consider fracking legislation, some discussion turned toward the benefits and drawbacks of fracking there and the associated political and regulatory hurdles (digbysblog.blogspot.com, 2012). Many of the pro-fracking blog posts emphasized the potential economic gains (realclearpolitics.com, 2012).

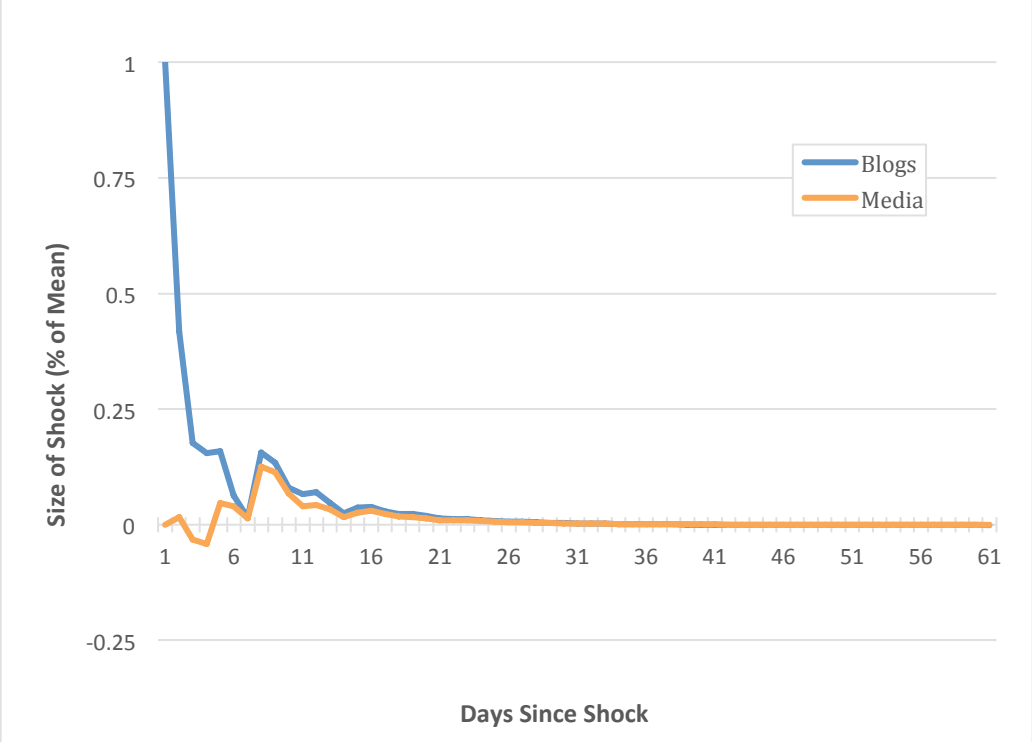
Toward the end of the period, I found that much of the discussion had turned toward *Promised Land*, a 2012 film about fracking starring Matt Damon. This included both those who supported fracking, who criticized the film as being inaccurate, overwrought, and bankrolled by foreign oil interests (daveinboca.blogspot.com, 2012). Anti-fracking bloggers were split in supporting or criticizing it, but did tend to talk about it considerably over this period.

Finally, in my dataset, many bloggers, particularly among the pro-environmental groups, paid attention to the ongoing battle over fracking playing out in New York State, where a review of the risks of fracking was extended. Fracking was eventually banned in the state. Many of these posts were critical of Governor Cuomo and his flirtation with allowing fracking, with some urging the Governor to ban fracking in the state (LadyBunny.net, 2012) while others suggested that he was

being controlled by oil interests (RochesterEnvironmentNY.blogspot.com, 2012). Indeed, this appeared to be an activist led discussion, which may have influenced Governor Cuomo's decision to delay the review panel's decision.

Whereas bloggers addressed a range of issues, my analysis of mass media shows that they concentrated more on elite or legislative changes, formal reviews, and other more official news events, as well as protests. There were several major events covered: California's examination of fracking, the United Kingdom lifting the ban on shale oil drilling (often connected to fracking), and the ongoing struggle over fracking in New York state. The latter appeared to draw the most attention, with hundreds of articles written about the role of activists (Cantarow, 2012) as well as the review process and the politics surrounding it (Bloomberg, 2012). The battle in California, which was instigated by activists suing the state, also drew considerable coverage (Mishak, 2012).

Figure 3.2. Fracking: Blog Shock



System Analysis. Figure 3.2 demonstrates the effect of a shock within the blogs community. As shown in Chapter 2, the most parsimonious model includes a one day media lag and a seven day blogs lag (blogs were the most statistically significant representation of public opinion). Because this is a uni-directional analysis, only this impulse response function is included.

When a shock occurs, it appears to take almost a week for the effects to manifest. In fact, attention on media tends to dip below the mean for a few days in the media, just as attention within the blogging community is dropping precipitously. Toward the end of the first week, attention within media begins to rise, perhaps in response to the plateau of increased attention among blogs (at about 20% above average attention). While blogs continue to drop, more media begins to pick up on the

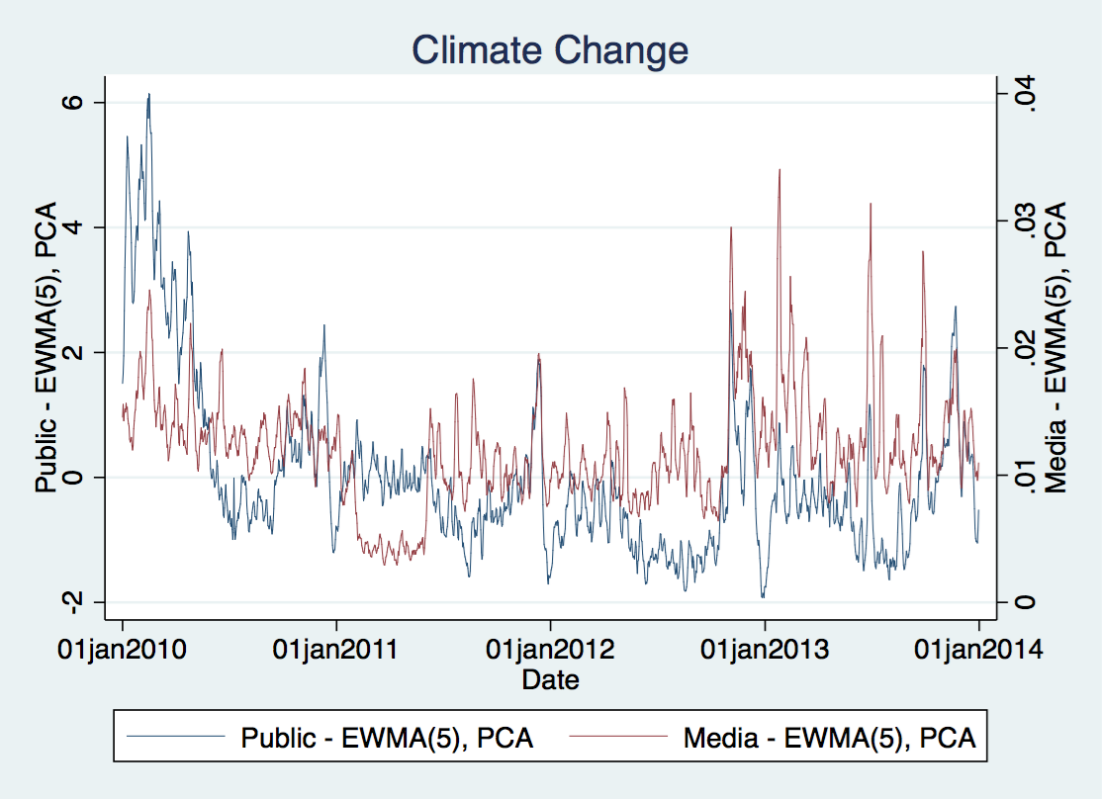
story, giving it legs through the second week, a phenomenon that coincides with a revisiting of the issue among blogs. Attention in both mediums accordingly peaks on day 8 and slowly returns to the mean after that.

Analysis. While it is difficult to pinpoint a single element of the fracking debate in which salience transferred from blogs to the media, the flurry of attention preceding the review session in New York appears to have precipitated the attention in mass media, which included the protests and online discussion as part of the story. However, as the impulse response function shows, this attention is in fact short lived, quickly being subsumed by other events by the second week.

Fracking is a technical issue, and it is also mostly a local issue: the scope of a fracking ban does not appear to immediately extend beyond the state or locale that implements it. Accordingly, national media only seems to attend to the issue when something occurs at an official level or when a protest movement appears to be drawing support. Unlike other issues, in which public attention drives media attention and the subsequent media attention in turn drives public attention, it does not appear that this cycle develops on this issue. Accordingly, bloggers, whether activists or non-activist members of the public, appear to be most effective when they are able to create a spectacle or spur official action.

Bi-Directional, General Activation: Climate Change

Figure 3.3. Attention to Climate Change



Context. Climate Change refers to the increase in global temperatures that has occurred since the beginning of the Industrial Revolution and that is projected to continue without intervention in the coming century. In the past century, this has led to an approximately 1 degree Celsius increase, with scientists cautioning that current economic and political structures (not to mention access to resources, geography, and other issues) cannot be sustained if temperatures increase another 2 degrees Celsius – a prospect alarmingly possible if current trends continue. Moreover, it is clear from the historical and geological records that the increased carbon levels in the atmosphere are a consequence of human activity, not some natural cycle. The effects

manifest differently in different parts of the globe, from increased temperatures in many areas, rising sea levels that threaten shorelines and islands, decreased temperatures in some areas (particularly the Eastern United States) and abnormal or unusual weather patterns in many places (Burch & Harris, 2014).

The political debate over climate change stems from the magnitude of the costs associated with mitigating this problem and the uncertainty associated with those costs. Because this is a global issue, it requires cooperative global intervention, but debates have ensued surrounding who should be responsible for it: developed states, who were largely responsible for the preceding several centuries of carbon emission, or rapidly developing states like India or China, whose large populations could permanently increase temperatures as they modernize. Several international efforts have been undertaken to address these problems, mostly through the United Nations (UN) Intergovernmental Panel on Climate Change (IPCC), as well as annual meetings of the Conference of the Parties (COP) to the UN Framework Convention on Climate Change (Bernauer, 2013).

In the United States, the debate over climate change has become polarized, with conservatives generally skeptical of climate science and liberals more supportive of it, despite overwhelming support for the associated theories within the scientific community (Gauchat, 2012; Nisbet, Cooper, & Garrett, 2015). Some of this skepticism has resulted from confusion over the science itself, with skeptics questioning climate change when the weather is cold while in other situations, the opposition is due to hacked emails purporting to show 'fixing' of data at a major

climate science research center in the United Kingdom. Recent studies have shown that elite cues and depressive economic conditions are most responsible for this climate skepticism (Brulle, Carmichael, & Jenkins, 2012), which suggests that factors at both the mass media and public levels are responsible for these political views.

This may explain the complex interaction between the mass media and the public. Chapter 2's tests showed a high level of interaction, with most elements of the public asserting a statistically significant ($p < 0.01$) influence on mass media (with the exception of Wikipedia page views) and the mass media influencing all measures of the public except for blogs at a statistically significant level. Because Twitter was consistent across both directions of influence, it will be used for this analysis.

With a few exceptions, my reading of public discussion of climate change shows that it is largely driven by weather. Long-standing complaints from climate change skeptics suggesting that cold weather showed the folly of climate change was a recurring theme, and led to increased attention on Twitter in winter months. For example:

Tweets from climate change skeptics such as these tended to be similarly snarky. However, they did not contribute to a noticeable increase in climate change news that shared this skepticism. Similar patterns of increased attention during winter and decreased attention during the summer were evident on the Google search and Wikipedia pageviews measures. There were frequently increases in coverage in mass media that coincided with increased attention on Twitter, particularly in early 2010 and late 2011, but they were about a variety of subjects. For example, a number of mass media articles in early 2010 covered the breakdown in talks over 'cap and trade' legislation in the Senate (Williamson, 2010). One subset, however, did try to explain the ensuing controversies or report on elite skepticism (Williamson & King, 2010).

One weather event did have a particularly large and lasting impact in my analysis: Hurricane Sandy, which devastated the New York City area October 29-30, 2012. The strength of the storm, as well as the property damage it caused, spurred the opposite reaction on Twitter from cold weather: instead of decrying climate change as a hoax, debate ensued as to how much additional devastation from the storm was the result of climate change. This also led to media consideration of the debate. While it is unclear where this began – media or public – attention in the media persisted longer than it did on Twitter, with stories linking Hurricane Sandy to climate change continuing into mid November.

I also found that major official events also drew attention within Twitter and mass media. On June 25, 2013, President Obama gave a major speech on climate

change in which he outlined plans to limit emissions from power plants. Three days later, supporters were still talking about it:

as were climate change skeptics:

Attention in mass media did not persist, with attention largely turned elsewhere by the time the above tweets were posted. In other words, while Obama's speech moved the public opinion needle, they were unable to draw lasting attention in the media.

Similarly, attention on Google and Wikipedia had returned to normal levels within 2-3 days.

System Analysis. As the model in Chapter 2 showed bi-directional influence, I will include impulse response functions for a shock on Twitter, on media, and a simultaneous shock. For media's influence over Twitter, Chapter 2's analysis showed that a two month, seven day influence from Twitter and a five day influence from the mass media. Twitter's influence over mass media was best represented by a two month, six day lag structure from the public and a one month, six day lag structure from mass media. Interestingly, this and Arab Spring are the only issues in which the public had a long-term influence over the mass media.

Figure 3.4. Climate Change: Twitter Shock

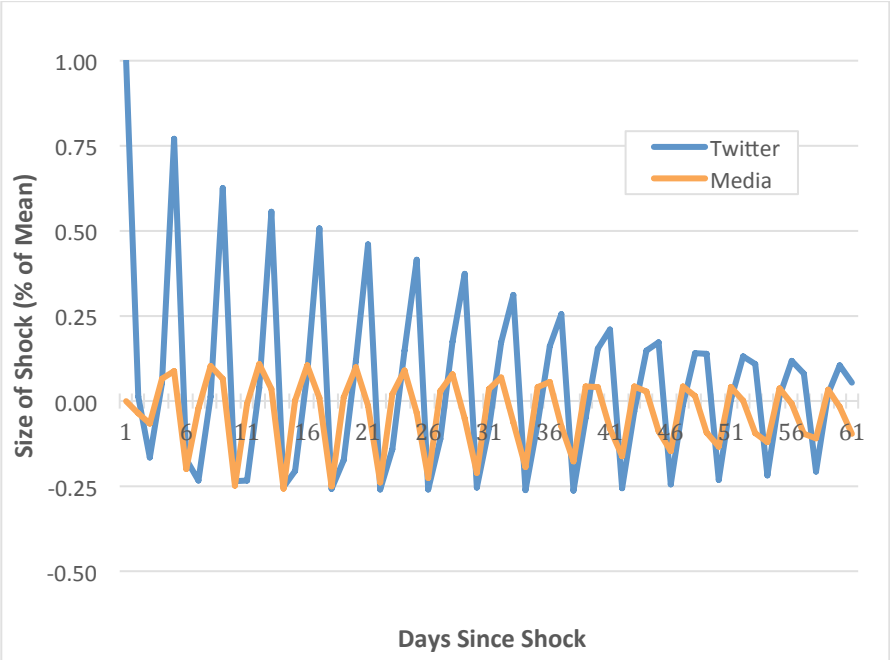


Figure 3.5. Climate Change: Media Shock

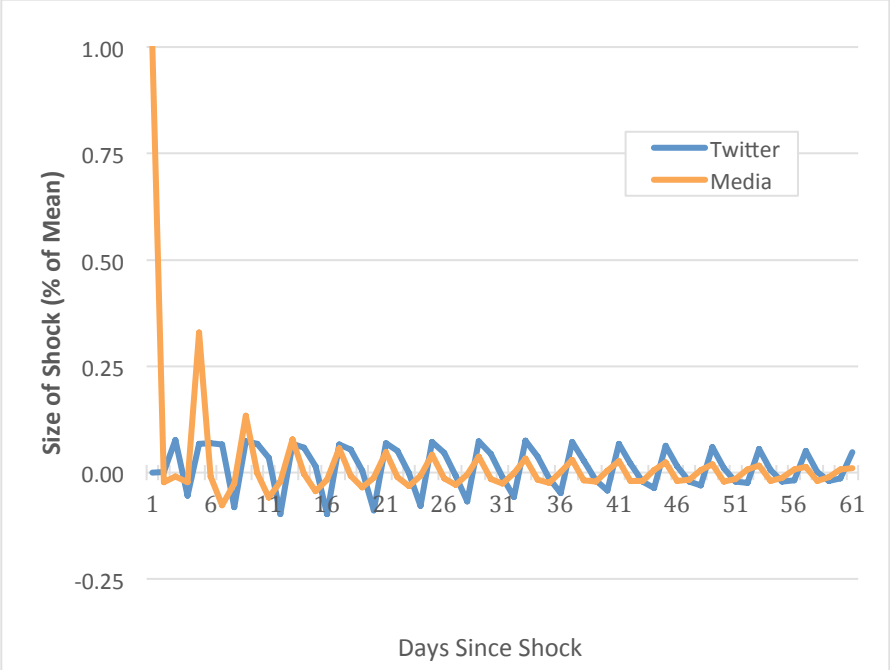
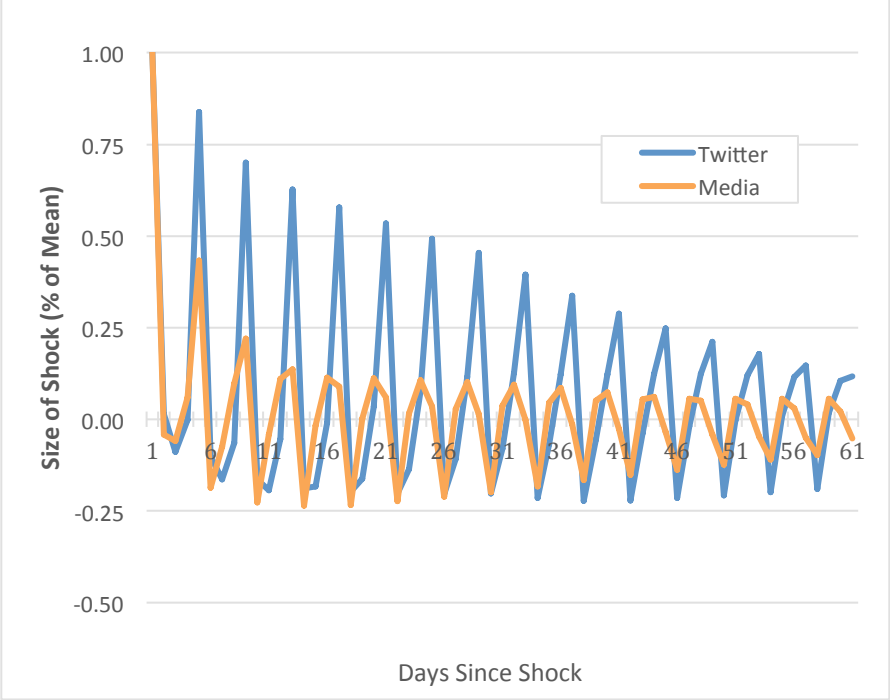


Figure 3.6. Climate Change: Simultaneous Shock



Figures 3.4-3.6 show the results of the impulse response function in graphical form. Interestingly, the results for each function demonstrate a cyclical pattern, in which attention in both mediums strays from the issue before being renewed a few days later, albeit at a lower level. In each instance, there is a clear downward trend, with subsequent peaks slowly dropping in intensity, and attention bottoming out lower than the initial value. This pattern may be a result of the long term trends at play in these models.

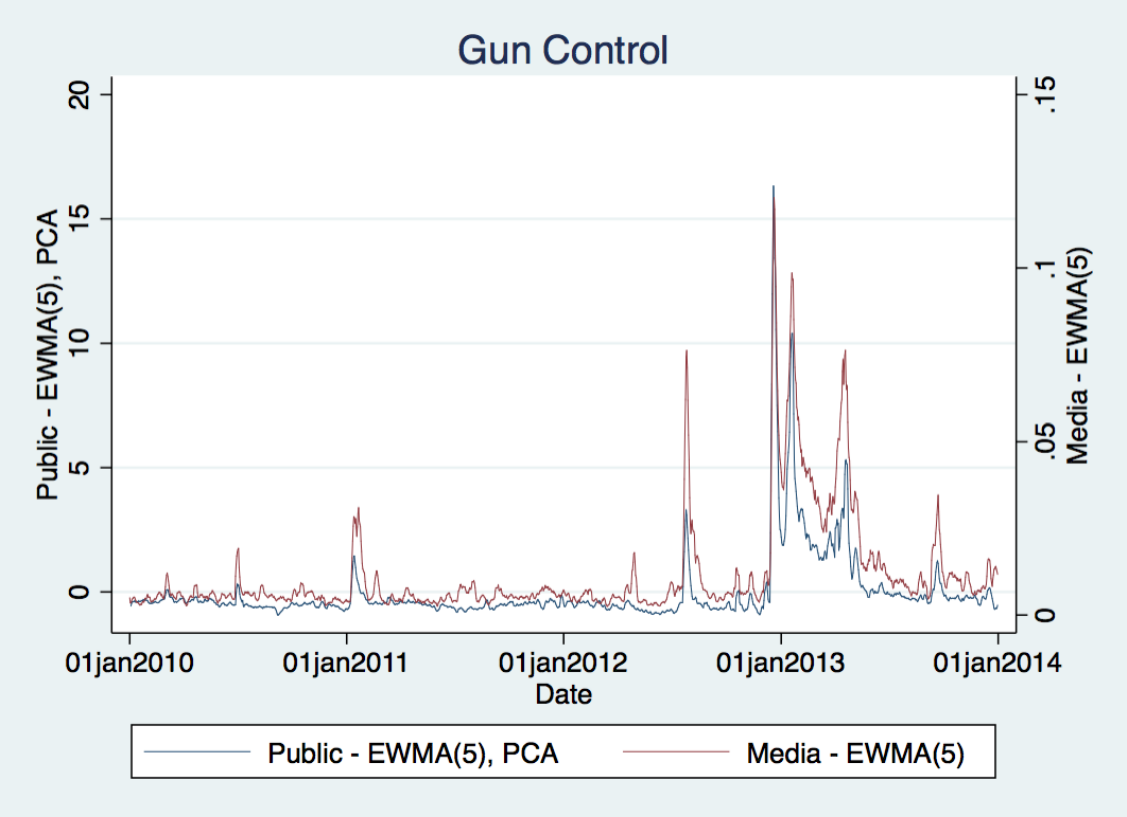
When Twitter is shocked, attention on Twitter peaks and drops over several cycles over a three day period, suggesting that attention is diverted quickly. Mass media attention in this model follows a similar pattern, albeit with less intensity, and appears to be diverted more quickly. When mass media is shocked, on the other hand, Twitter barely responds, with the cycle's peaks hitting about 10% initially, then much lower later, with each subsequent peak decaying more quickly. Mass media's first peak, at around 30%, is never replicated, with subsequent periods of renewed attention on par with Twitter attention. Finally, simultaneous shocks resemble the shock on Twitter, with slightly higher effects on mass media.

Analysis. Attention to Climate Change on Twitter and on mass media do not appear to be in sync very often, with Twitter users often casting a skeptical eye toward climate change during the winter and ignoring it the rest of the year, and the media addressing climate change in a range of ways, but occasionally reporting on the conflict itself. When it does so, the mass media appears to repeat these refrains frequently over the following days. Despite this disparity, there does appear to be

moments of topic correlation, such as when President Obama released his vision for regulating power plants. In this instance, mass media attention shifted quickly, while Twitter attention lingered. It is unclear why this is the case; many of the later tweets appeared to be from people who had just heard about the plans rather than responses to an ongoing discussion. This may reflect people being informed through other mechanisms.

Bidirectional Crisis Activation: Gun Control

Figure 3.7. Gun Control Timeline



Context. The gun control debate is rooted in the ambiguity of the Second Amendment of the U.S. Constitution, which guarantees the right to bear arms, but, by some interpretations, frames this in terms of the militia and not personal use

(Waldman, 2014). The debate is uniquely American; in many ways it mirrors the urban/rural divide as much as it does the frontier mentality that still holds salience amongst many Americans (Spitzer, 2011). In some instances, this has taken on almost an insurrectionist facet, as some opponents of gun control legislation (and federalism more generally) believe that any restriction of gun rights is an abrogation of freedom that should be countered with violence (Cook & Goss, 2014).

The nexus of most of the mainstream opposition to gun control laws is the National Rifle Association (NRA), which in the 1980s started turning toward gun rights legislation by lobbying for the repeal of concealed carry laws in the states (Cook & Goss, 2014). Analysis of the passage of federal gun control legislation showed that financial support from the NRA predicted a legislator's vote against this legislation (Kahane, 1999). Indeed, after a spate of legislation in 1994, Democrats believed that the NRA was responsible for their defeats in subsequent elections, although this was not borne out by the evidence (Kenny, McBurnett, & Bordua, 2004). Nonetheless, the Democratic Party, by now the main supporter of gun control legislation, limited their efforts on this issue, and adopted pro-gun language in national party platforms (Cook & Goss, 2014). Accordingly, by the start of 2010, gun control was a secondary issue, if not a third or fourth tier issue. That would change in subsequent years, however, as events prompted a revisitation of this debate.

The first major incident related to gun control during the period under study was the January 2011 shooting of Democratic Representative Gabrielle Giffords at a campaign event in Tucson, Arizona. Six people were killed in the shooting spree

(Lacey, 2011). Almost immediately, some began stressing the climate of violence in the region:

My investigation showed that the discussion also quickly acquired a partisan tone, as Democrats pointed to an image former Republican Vice Presidential candidate Sarah Palin had released the previous year in which a map of the United States was overlaid with crosshairs on Congressional districts that Palin believed could be won by Republicans instead of the Democratic incumbent. Representative Gifford's district was featured in this map. Approximately half an hour after the shooting, Twitter users were noticing the connection. The earliest Tweet available through Twitter search on the issue notes the connection:

Soon thereafter, I found that more prominent Twitter users had noticed this, and chastised Palin for, first, making the map, and second, taking it down. Among the most retweeted early Tweets on this came from left-leaning activist Michael Moore:

Attention to this partisan element extended into media as well, with several media sources citing that map that day; by the next day, traditional sources such as the New York Times were calling for an end to the climate of fear that had engulfed the country in recent months, and blamed Republican officials and media for cultivating this environment (New York Times, 2011). This view was, of course, not shared by everyone, with bloggers, Twitter users, and members of the media chastising the liberal media for immediately blaming Republicans (Sheppard, 2011).

Although the volume of attention to this issue makes it difficult to see who started the discussion, in the aftermath of the attack, gun control became a frequent and early topic. Some gun rights supporters attempted to pre-empt this debate:

while supporters of gun control also began talking about it online:

In fact, Gun Control quickly became a major topic of discussion. On January 7, 2011, "gun control" and related terms were just 0.4% of news articles, 3% of Tweets, 11% of blog posts and 1.6% of Google searches. The following day, attention had shifted dramatically, with 1.6% of news articles attending to the issue, and 12.6% of Tweets, 19.5% of blog posts, and 3% of Google searches. Those numbers continued to rise in the coming days, peaking on Twitter at 15.2% on 1/9/2011, blogs at 39.7% on 1/12/2011, and Google searches at 8.4%, also on January 12th. Amongst the public, attention to this issue generally returned to the median within 1-2 weeks,

with attention on blogs persisting at elevated levels until around January 28th – but, even on blogs, exhibiting a downward trend.

Media attention also began to subside in the days following the attack, dropping to just 1.4% of all articles, but this diversion was short-lived: by the 19th, media attention briefly returned to gun control. A survey of the articles at this time period shows that they were describing the debate over gun control legislation that had been introduced by Representative Carolyn McCarthy of New York (Parkinson, 2011). While this legislation did not come up for a vote in the newly Republican House, the existence of it focused media attention – potentially because of the familiar political wrangling angle of the story. It also drove a minor uptick in public attention (of about 1-2% in each medium), which did not continue. By the following week, attention in both the media and the public was returning to its mean. Such was the avoidance of gun control that President Obama even gave a State of the Union address that week without mentioning the issue.

Similar patterns were repeated two other times during this period: after the July 20, 2012 shooting in a theater in Aurora, Colorado, and after the December 14, 2012 shooting at Sandy Hook Elementary School in Newtown, Connecticut. My reading showed that after the Aurora shooting, public attention faded more quickly than media attention, just as it did after Gifford's shooting. Attention among both the public and the mass media persisted for longer after the Sandy Hook shooting and the resulting, wide ranging gun control debate, but as each new element of the debate commenced, the public appears to have turned away from the discussion before the

media. In fact, gun control did not register at all as an important problem to the public, according to Gallup's monthly poll (Jones, 2011).

System Analysis. Results from the Granger test suggested that Gun Control was a bidirectional issue, in which attention in the public and mass media was mutually reinforcing at the $p < .001$ level for all public-media interaction modes. Additionally, the principal components analysis showed high loading on the first component – an eigenvalue of 3.126, higher than all other issues except terrorism – suggesting that there was considerable shared variance across all mediums. Accordingly, and because it is difficult to conceptualize discussion of a component, the impulse response functions will explore the interaction between Twitter and mass media.

Figure 3.8. Gun Control: Media Shock

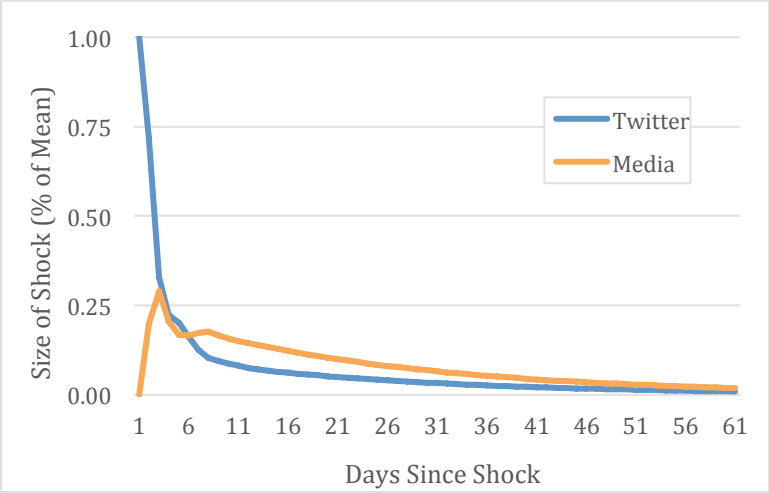


Figure 3.9. Gun Control: Twitter Shock

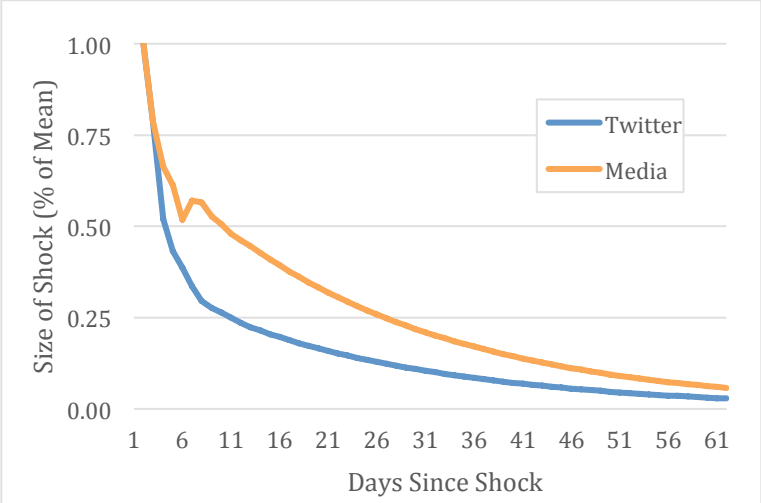
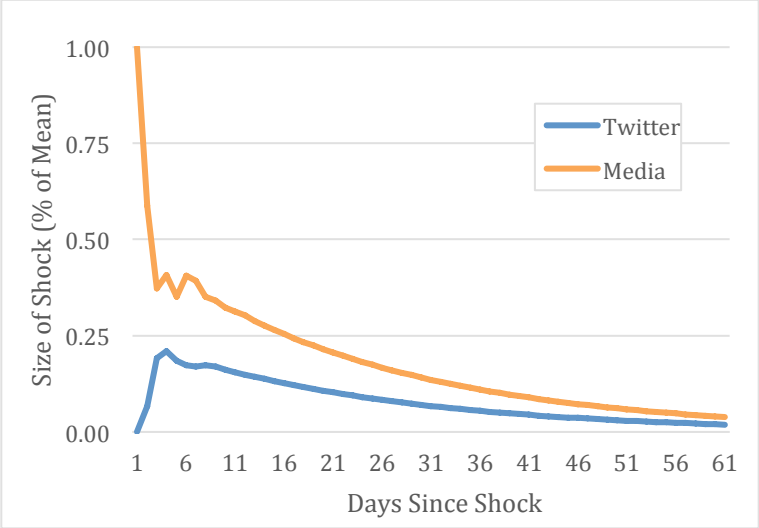


Figure 3.10. Gun Control: Simultaneous Shock



Figures 3.8-3.10 shows the impact of a major gun control-related incident on the levels of attention toward that issue within the mass media and Twitter. This is based on the most parsimonious model discovered in Chapter 2, which showed that Twitter attention was influenced by the previous three days of Twitter attention and

the previous 2 days of mass media attention, whereas mass media attention was best explained by a six day twitter / five day media model.

When an event takes hold on Twitter, mass media responds immediately (one day later), with peak attention occurring on day three. Mass media attention is often diverted, however, dropping precipitously for two days before briefly returning to the issue a bit, and then slowly turning attention elsewhere. Meanwhile, Twitter attention drops sharply, down to about 25% of the mean by the 4th day and under 10% of the mean by the 8th day. Unlike mass media attention, there is no comparable return to attention, with the result that, even when the event breaks first on Twitter, attention noticeably persists in the media at a higher rate than it does on Twitter.

Events that take hold on media first exhibit similar patterns, at least for media. On mass media, attention falls to the 35-40% level within three days, but it then lingers above 30% of the mean for 10 days, with some volatility in attention, and then slowly decays. On the other hand, attention on Twitter rises over the course of three days to about 21% of the mean and then slowly fades away. 60 days later, attention on media is still slightly higher than attention on Twitter.

When an event is registered equally (as compared to that system's mean) on both systems on the same day, similar patterns emerge. Within the mass media system, the second round of attention that is evident in the mass media in the other scenarios occurs on day five, with similar attention on day six before gradually decaying. Attention on Twitter drops off quickly within the first four days, and then

also gradually decays. By the third day, media attention has outpaced attention on Twitter, and this dynamic persists as attention wanes.

Analysis. The Granger Causality tests suggest that Gun Control is a bi-directional issue, with mass media and public attention forming a reinforcing feedback loop. This may be because of the event-based nature of the attention to this issue, in which attention skyrockets in response to some tragedy, but quickly fades away. Mass media and public attention rises in tandem, and some of the sub-issues, such as Palin's map, travel from one to the other easily.

The public is much more fickle than the media, however, on this issue. This may be a consequence of the issue itself. Gun control has a long history as an issue in this country, dating back to its founding. In the modern era, it has been a commonly discussed issue since at least the 1980s. Moreover, it has calcified along partisan lines (Cook & Goss, 2014). Accordingly, many people already have well-considered and stable opinions on the issue; perhaps their interpersonal debates are just people talking past each other, as illustrated by some of the Tweets above. So people move on, and dismiss some of the news around it, although this does not mean that a core of interested members of the public – a spontaneous issue public – give up on the issue. The mass media, on the other hand, continues to attend to the issue as long as elites do, explaining their continued attention.

Conclusion

This chapter expanded on the system dynamics explored in Chapter 2. Whereas Chapter 2 tried to identify general patterns, this chapter explored the

discussions and topics of public and mass media attention and, where possible, tried to untangle the interaction cycles between the two mediums. To do so, I relied on typology of interaction and attention activation. The resulting typology categorized issues according to the direction of interaction as well as the patterns that interaction took, as attention in many of the bi-directional issues appeared to increase only during crisis periods.

I selected three issues to represent these categories: Fracking for the public influence over the media, climate change for general bi-directional influence, and gun control for bi-directional crisis issues. Each of these are contentious issues in their own way. Gun control is a long-standing issue, dating to at least the 1980s, with polarization largely among partisan lines. Climate change has also polarized in recent years along partisan lines, with many Republicans believing that it is a hoax. Accordingly, the contentious frames surrounding the issues have largely been concretized. Fracking, however, has only been an issue in the last 7-8 years. At the national level, it is polarized and often seems to attract little attention, but at the local level, where people are actually affected by it, the lines are not so clear. This may be why fracking is one of the few issues in which influence flows from the public to the mass media but is not statistically significant from the mass media to the public.

While it is difficult to extrapolate results to other issues, several patterns emerge from these case studies. The mass media appears to attend to issues longer than Twitter, as shown by the gun control example and several periods in climate change. Additionally, each issue shows different patterns of interaction, with the most

unique being the cyclical interaction of climate change. In this example, it is interesting that attention waxes and wanes the way it does; this may be a consequence of the news cycle renewing from elite engagement.

Indeed, there is a powerful role for elites in all of these case studies. In fracking, getting elites to notice your protests or take official action appears to be the most effective way to get mass media attention. In the climate change issue, the mass media attended more to official action than the public, but both responded strongly (if briefly) to Obama's climate change action. Despite the renewed attention to the role of the public in this kind of analysis, it is clear that elites are still intrinsic to the process of attention activation.

Each of these case studies deserves their own, much more in-depth analysis. The bi-directional influence issues would particularly benefit from this. Given more time and space, one could uncover more fully how the interactions occur: whether attention begins on Twitter, which members of the public or the mass media are most influential, how mass media outlets respond to the public and to each other, and how these feedback cycles quicken and intensify before unraveling. In the meantime, the impulse response functions shed some insight into this interaction. As this research continues, hopefully more in-depth qualitative analysis can be conducted to compliment this more quantitative approach.

Chapter Four:
Spheres of Attention

The "Fast and Furious" scandal, which broke in late 2011, involved a U.S. Bureau of Alcohol, Tobacco and Firearms operation that allowed suspected Mexican drug dealers to buy weapons at American gun dealerships, in the hope that they could be tracked back to the leadership of the Sinola cartel (Horwitz, 2011). The failed operation was investigated by several committees in Congress and resulted in a Contempt of Congress charge against Attorney General Eric Holder (Silverleib, 2012). Crucial to the scandal were waves of attention across right-leaning media. A Lexis-Nexis search of Fox News, for instance, finds over 600 mentions of the scandal in the period 2012-2013, while a Google search of Rush Limbaugh transcripts elicits over 400 results. A similar search of Redstate.com, a right-leaning blogging community, finds almost 9000 pages. On the other hand, a similar Lexis-Nexis search of MSNBC, often viewed as a left-leaning network, shows fewer than 200 mentions. Similarly, a Google search of Dailykos.com, a left-leaning community similar to redstate, finds just 2,750 webpages.[5] These results suggest that Fast and Furious received asymmetric attention between liberal and conservative media.

Fracking, a controversial process of extracting natural gas from the ground that critics say poses severe environmental risk, exhibits the same asymmetry but in the other direction. Although it received negligible coverage in both cable networks,

[5] Search text for all was simply "Fast and furious". While this may also pull in stories about the movie series with a similar name, these effects are likely to be similar across outlets.
For Google searches, the operator 'site:' and the site name was also added.
These sites were chosen for their prominence, general interest focus, and community element. Similar searches among other partisan sites showed the same disparity.

there was a great deal of coverage disparity between online sources: a Dailykos search resulted in over 37,000 results while a Redstate search only found about 8,500 results.[6]

Partisan media are well known for how they talk about issues, namely that they blur editorial position-taking with news reporting and they commonly seek to advance a political viewpoint about what they cover (Aday, 2010; Feldman et al., 2011; Jamieson & Cappella, 2008; Williams & Delli Carpini, 2011). Less well known is the extent to which partisan media differ in *what* they cover. The examples of Fast and Furious and fracking suggest that disparities in attention to issues may be an important characteristic of the partisan media environment. However, there is a paucity of systematic analysis comparing agendas across many issues. In this paper I explore this aspect of partisan media. Specifically, I ask whether there is a significant distinction between the agendas of left-leaning, right-leaning, and centrist media. I expect to find systematic differences in issue attention between partisan and non-partisan media, as well as between left- and right-leaning partisan media.

To test these expectations, I analyze 11 million articles from approximately 100 sources, including traditional media and online media, over the period of 2010-2013. I then test the variability of agendas across partisan media and non-partisan media. My findings show that there are differences between the agenda sets of both centrist and left leaning outlets and centrist and right leaning outlets, with left leaning media

[6] Search text was "fracking site:redstate.com" and "fracking site:dailykos.com"

being the most frequent outlier. Some of these differences, I show, conform to classic conceptions of issues favored by the right and left.

Theoretical Review

Agenda Setting Theory

Agenda setting refers to the process by which issue salience is transferred from the media to the public: over time, the rank order of issues to which the media gives prominence will be reflected in the list of issues the public considers important (McCombs, 2004). According to years of theorizing and research, the most prominent media issues often become the most important public issues. The first agenda setting study found correlations as high as .97 in some situations between the media agenda and the public agenda (McCombs & Shaw, 1972). Agenda setting has been found to describe the media - public interaction across a myriad of issues, including environmentalism (Ader, 1995), civil rights (Winter & Eyal, 1981), immigration (Dunaway et al., 2010), foreign affairs (Wanta & Hu, 1993) , and many others. The effect has also been uncovered in several countries, including the United States, Germany (Brosius & Kepplinger, 1992), Spain (Lopez-Escobar, Llamas, McCombs, & Lennon, 1998), and Japan (Mikami, Takeshita, Nakada, & Kawabata, 1995), among others. Moreover, agenda setting has been shown in surveys and in experimental research (Iyengar & Hahn, 2009; ie. Iyengar & Kinder, 1987).

The assumption of a single media agenda underlies much of the agenda-setting literature, from small studies that explore one issue (e.g. Ader, 1995) or one region

(Atwater et al., 1985) to broad studies that evaluate agenda-setting across a range of issues and time (McCombs & Zhu, 1995). In fact, many of these studies use only one media outlet (e.g. Behr & Iyengar, 1985; Iyengar & Simon, 1993; Shaw, McCombs, Weaver, & Hamm, 1999; Yagade & Dozier, 1990) or a few media sources (e.g. Craft & Wanta, 2004; McCombs & Shaw, 1972; McLeod, Becker, & Byrnes, 1974; Roberts et al., 2002) across mediums to represent the media's agenda. Even those studies that used a wide range of media sources (Dunaway et al., 2010; Erbring et al., 1980) treated the sources largely equally. In a survey of the most cited agenda setting studies, only a few (e.g. McLeod et al., 1974; Sweetser & Lariscy, 2008) evaluated whether or not there were any differences between the agendas of each outlet (see Appendix 1).[7]

Agenda-setting researchers use a number of justifications for this. Winter & Eyal (1981), for instance, limit their analysis of media to the New York Times because it "is considered the most prestigious national newspaper" and would therefore "be indicative of national media coverage" on civil rights, the issue they were studying (p. 379). But even studies that do evaluate agenda differences can neglect sources that are likely to have a distinct agenda. For example, in a study of the Internet's effect on traditional media, Lee (2007) includes CNN but does not include Fox News because the two networks likely have similar coverage and a shared audience (p. 750), although the accuracy of that claim is not evident in the piece.

[7] Because there are thousands of agenda-setting studies, this meta-analysis is not meant to be comprehensive. To gather studies, I did a search for "agenda setting" and media in both Google Scholar and Web of Science. I included all articles and books that featured original research on media-public agenda setting in the first 10 pages of results, and supplemented that list with studies that were cited in that literature multiple times, as well as studies that were included in this paper.

A single media agenda?

Even in the current age of incredible media diversity, the assumption of a single agenda is not unreasonable. There are several reasons why one would expect the same or a similar agenda reflected across media outlets. First, media outlets share a similar set of procedures, routines and journalistic norms because they are required for news production to function (Cook, 1998) and, according to market-based theories of news production, to be profitable (Hamilton, 2004b). The "news factory" is therefore standardized across industry in order to ensure that journalists, producers, cameraman, etc., who often switch jobs, can seamlessly integrate into an organization (Bantz, McCorkle, & Baade, 1980). Additionally, many of the norms, like objectivity, are instilled in journalism school and reinforced by these organizational routines across the industry (Gans, 2004; Waldman & Jamieson, 2003).

Second, this dynamic can shape story selection, or the determination of newsworthiness. Given enough time and space, the news media can be thought of as a mirror to reality; but in the real world, with limited broadcast time and news pages, some criteria has to be established for story selection (McCombs, 1991, p. 47). A number of factors affect this newsworthiness criteria for a given event, including magnitude, clarity, the policy area, the level of sensationalism, actors involved, proximity to the reader, and others (Boydstun, 2013; Galtung & Ruge, 1965). Even when media sources do not initially adopt the same stories, once a story has gained prominence, outlets often mimic each other because they do not want to miss out on an important story (Boczkowski & Mitchelstein, 2010; Graber, 1971).

Third, many scholars have found that non-media elites have an outsized influence on reporting (Berkowitz, 1992). For instance, indexing theorists like Bennett, et al. (2007) find evidence that media framing of an issue correlates to the frames promoted by elites, with more prominence given to frames from more elite officials. As a result, the media's interpretation of an issue or event reflects the elite discourse about it. Alternately, Entman (2004) describes a networked cascade model in which frames flow from elites through different elements of the media and to the public. While both of these models describe framing processes, their basic insights can be extended to news selection: if elites can influence the discussion of issues, shouldn't that influence extend to which issues receive attention in the first place?

Finally, a small literature has examined the phenomenon of intermedia agenda setting, in which the agendas of one media source influence others; if this phenomenon is valid, one can study just the most influential outlets. Danielian and Reese (1989) found that news outlets across the country began turning their attention to the issue of drugs only after the *New York Times* did. Similarly, Golan (2006) found that the international news agenda in the *New York Times* informed the international coverage of the evening news. In fact, in one study, newspapers in general were found to influence television (Roberts & McCombs, 1994). This effect is not uniform; for instance, Weaver and Elliott found that local media were more likely to follow local issues rather than national issues (Weaver & Elliott, 1985). Although intermedia agenda setting extends into the online sphere, the results are mixed: Lee, et al. found that the blog agenda and the media agenda were largely

similar during the 2004 election (Lee, Lancendorfer, & Lee, 2005) whereas Meraz found that effect had diminished, and, in some cases led to reverse agenda setting (Meraz, 2011b).

Media Fragmentation

While major events are likely to be covered by all outlets (Birkland, 1998), the confluence of these factors - journalistic norms and organizational homogeneity, decisions about newsworthiness, the influence of external actors, and the prevalence of intermedia agenda setting - support the idea that smaller events and issues are likely to have similar coverage across the news media. Yet the continued media fragmentation and media choice precipitated first by cable television and then by the Internet threatens many media effects theories, including agenda setting (Bennett & Iyengar, 2008; Chaffee & Metzger, 2001; Holbert et al., 2010). In this context, fragmentation refers not just to the proliferation of news outlets, including professional online news sources, blogs, and social media, but also to the specialization inherent in this process, which could lead to niche outlets (Prior, 2007; Tewksbury, 2005). Fragmentation accordingly could undermine agenda setting because it limits the percentage of the public that is exposed to the dominant media agenda - if a dominant agenda even exists. Some evidence suggests that new media is undermining this dominant agenda. For instance, Maier (2010) found around a 60% congruence between online and offline media agendas, with the greatest similarities between online media and network news.

As the media fragment, two simultaneous and corollary agenda setting trends may develop: the influence of elite, traditional media may diminish while other outlets may gain agenda setting power. Addressing the latter, Meraz (2011b), Schiffer (Schiffer, 2006), and Wallsten (Wallsten, 2011) all show that blogs have influenced the agendas of traditional media sources, although the results are not uniform across traditional outlets. It appears that no research has examined any diminishing of the influence of traditional outlets, so the path of this trend is unclear.

Partisan Media

One trend has been consistent, however: partisan media has expanded as a consequence of fragmentation. Once limited largely to talk radio and some newspapers, partisan media now includes a major 24-hour news channel (Fox News) as well as dozens of high traffic websites and perhaps millions of blogs. In a landmark framing study, Jamieson and Cappella (Jamieson & Cappella, 2008) showed that right-leaning media act as an echo chamber, reframing mainstream media news for their audience, policing ideological purity, and balkanizing and insulating its audience against effects from mainstream media. Other studies, though more limited, have shown that partisan media tends to reinforce ideological views on specific issues. For instance, Aday (2010) found that Fox News offered a much more favorable view of the Bush Administration than NBC did, while Feldman et al. (2011) showed that Fox News' coverage of climate change was much more negative and dismissive than that of the other cable news networks. Moreover, this coverage tends to emphasize outrage as a form of expression (Sobieraj & Berry, 2011). This

kind of opinion-based reporting often replaces unbiased reporting in what would otherwise be a neutral media source (Williams & Delli Carpini, 2011).

There is limited evidence that the kind of news that is covered may also differ, at least in the online sphere. For instance, weblogs (blogs) tend to overemphasize news that is good for their political side while minimizing news that is detrimental to their views when compared to 'neutral' wire services (Baum & Groeling, 2008). Additionally, partisan blogs tend to influence each other, with the result that agendas among blogs of the same partisan sphere tend to follow a similar agenda (Meraz, 2011b). This can cross the new media-traditional media line, with blogs and other partisan media influencing the traditional media agenda on some issues (Dreier & Martin, 2010; Meraz, 2009; Wallsten, 2007) and successfully reframing coverage on others (Ignatow & Williams, 2011).

Hypotheses

This research suggests that political communication's traditional conception of the media insufficiently describes the reality, and that new paradigms (or adjustments to pre-existing ones) may be needed. As the debate between Holbert et al. and Bennett et al. suggests, fragmentation and especially the rise of niche, often partisan sources may indeed preclude the existence of a single, coherent agenda across outlets (except in the instance of major events). Instead, an outlet's agenda may reflect its political leanings, with left-leaning outlets featuring stories that reflect favorably on the Democratic Party or highlight left-wing issues and right-leaning outlets doing the opposite. There are several potential reasons for this. First, this may be similar to

documented cases of elected officials trying to promote issues that are favorable to their party and most likely to lead to electoral victory (Sellers, 2009, p. 63). Partisan media may have similar motivations (Sherman, 2014). On the other hand, these outlets may prioritize issues because they are intrinsically important to them for ideological reasons. For instance, a left-leaning outlet may devote more of its agenda to a left-leaning issue such as inequality or poverty not because it is necessarily politically advantageous but because it is a core issue to the ideology. Business motivations also apply: outlets may just be catering to an audience that seeks to hear about issues with which they are concerned (Uscinski, 2009).

A primary component of this idea is agency – the active decision on the part of newspaper staff to emphasize certain issues over another. This is a departure from the ideal of journalism as a mirror of reality and violates norms of objectivity inherent in newsrooms. Accordingly, these effects would be greater for outlets that have an explicit partisan outlook.

One way to operationalize this idea is by employing the traditional distinction between issues that are classically understood to favor one party over the other. For instance, national security, law-and-order, and traditional values topics are favorable to the Republican Party, while issues of social justice (including poverty and women's issues) and intergroup relations have fit this criterion for the Democratic Party, and other issues, such as corruption or the economy can favor one party or another depending on incumbency (Petrocik, 1996; Petrocik, Benoit, & Hansen, 2013). Accordingly, my first hypothesis suggests that:

Hypothesis 1a: Compared to non-partisan media, partisan media will attend more to issues that are more politically favorable to their views/political fortunes.

,*Hypothesis 1b:* Left-leaning media will attend to social justice, poverty, environmental, women's issues, and related issues at a higher rate than other outlets.

Hypothesis 1c: Right-leaning media will attend to issues related to national security, traditional values, and law-and-order issues at a higher rate than other outlets.

Hypothesis 1d: Other issues, such as corruption or economic issues, will receive more equal attention across outlets or be prioritized in centrist outlets.

Additionally, following Meraz (2011)'s study of blogs, the agenda of partisan media outlets is likely to be much more similar to that of their co-partisans than to other media outlets. This phenomenon stems from the epistemic closure and echo chamber effect Jamieson and Cappella (2008) document. In their telling, right-wing partisan media outlets borrow story ideas (and frames) from outlets with a similar ideological disposition. This reinforces the links between the outlets both within the ideological network but also within the minds of audience members. Because each outlet engages in ideological policing and in-group/out-group language, media sources within the partisan network are able to keep others from straying too far away from party ideas, at least on important issues.

There are good reasons to think that this effect extends beyond those outlets examined by Jamieson and Capella, namely the Wall Street Journal editorial board, Fox News, and Rush Limbaugh. Through a similar mechanism of in-group / out-

group policing and intermedia agenda setting within the partisan network (e.g. Messner & Distaso, 2008; 2008), the agenda issue profile of outlets within the broader partisan media networks should, across issues, look more similar to that of other partisan outlets than outside of them.

There may be several mechanisms through which this functions. Most of the research on partisan agendas online have focused on blogs and their relationship with elite media. Within that corpus of research, several studies showed that left-leaning and right-leaning bloggers consume different media diets (Adamic & Glance, 2005; Meraz, 2009). Additionally, Messner and Garrison (2011) showed that while liberal blogs are likely to follow the agenda of the traditional, non-partisan media, conservative blogs are more likely to follow conservative media than non-partisan media. Peer pressure within the informal social network that developed within the partisan blogosphere produced homogeneous agendas (on the secondary, attribute level), reducing elite agenda setting capability (Meraz, 2011).

These findings point to a few important implications. First, they reinforce the idea that there will be noticeable differences in issue coverage between outlets as a function of their partisan leanings – at least among blogs. Additionally, as Jamieson and Cappella showed, there is tight coupling across outlets of a similar partisan angle (with a potentially stronger effect for conservative media).

Hypothesis 2: Because partisan outlets develop a common agenda, within group agenda variation is smaller than across group agenda variation.

This can be imagined as a set of partisan and non-partisan spheres, with largely reinforcing agendas that are distinct from other spheres. The agenda of media spheres likely will not differ on each issue, but the emergence of differences between media types on a variety of issues may form distinct agenda profiles for each partisan grouping.

Data and Methods

To test these hypotheses, I collected news articles, blog postings, and broadcast transcripts on 25 public policy issues over the period January 1 2010 – December 31 2013 using data from Lexis-Nexis, Crimson Hexagon (a social media, blogs, and news database), and, in one case, directly from the websites of the news outlet. Articles were selected using a keyword search, which was developed using an iterative process. First, I combined categories from the Policy Agendas Project (*policyagendas.org*, n.d.) and the Most Important Problem codes used by McCombs and Zhu (1995). From this combined list, I selected general categories and developed an expansive set of keywords relating to the topic. I then tested those keywords against both Crimson Hexagon and Lexis-Nexis and inspected the results to determine if keywords were producing spurious results. For instance, the use of the term "pro-choice" in a search on the issue abortion returned every article in which a politician was described as pro-choice, even if the article had little to do with the issue, so that keyword was dropped. The full list of keywords is available in Appendix 2.

The data set drew from approximately 100 outlets from several different mediums: broadcast news, newspapers, and major blogs (Appendix 3). All major American television news networks (ABC, CBS, NBC, as well as CNN, Fox News and MSNBC) as well as NPR were included in the broadcast news category. These data were downloaded from Lexis-Nexis. Newspapers were limited to the top 25 newspapers by circulation, as ranked by the Association for Audited Media. This list included newspapers with a national reach, such as *The New York Times* as well as more local newspapers like *The Houston Chronicle*. I also included the Associated Press, *Time* and *Newsweek* to include alternative mediums, and included *The Washington Times* because it is an expressly partisan outlet in the nation's capitol. This resulted in 35 traditional news sources. Any online blogs hosted by these newspapers were also included. Additionally, I included non-media blogs and digital news outlets, which were selected from Technorati.com, a site that ranked blogs in various categories, including U.S. Politics, according to their relevance to the category and how frequently they were linked (Technorati, 2014).[8] Drawing from monthly snapshots of these rankings recorded on Archive.org, a site that archives web sites, I created a list of those blogs who appeared in the top 30 results in this category three times in the period 2010-2013. 42 blogs and 22 other digital outlets were selected using this method. Data for both newspapers and blogs were retrieved from Crimson Hexagon. Additionally, because talk radio is an important component of the conservative media ecosystem, I included transcripts of Rush Limbaugh's daily radio

[8] Since data collection, Technorati has rebranded their website and no longer publishes these rankings.

program, which I retrieved by scraping the rushlimbaugh.com website using a custom script and the scrapy framework.[9] After removing duplicates, this dataset included over 11 million articles and blog posts.

Classifying outlets according to their partisanship is a difficult task, and the appropriate method for doing so is still debated. Groseclose and Milyo (2005) measured media bias by counting the number of times each outlet cited liberal, centrist, or conservative think tanks, and found that most outlets were biased to the left. On the other hand, Gentzkow and Shapiro (2010) develop a measure of media bias based on a newspaper's position relative to members of Congress. Outside of these indices, others have looked at individual outlets on specific topics, such as Puglisi's (2011) study of economic issues in the *New York Times*.

Specifying media bias is not a focus of this study. Moreover, the outlets included were diverse, and many have not been examined in the literature. Therefore, I use a combined approach. Newspapers were categorized as left, right, or center based on their slant score in Gentzkow and Shapiro (2010), which includes a large grouping just left of center as well as outliers on the left and right. Based on this study, the *Houston Chronicle*, *Wall Street Journal*, *Washington Times*, *Arizona Republic*, and *Daily Oklahoman* were categorized as right-leaning. The *Atlanta Journal-Constitution* was the only newspaper classified as left-leaning; all others were considered centrist for this measure in this study. Broadcast sources were

[9] Rush Limbaugh, besides being perhaps the most influential talk radio host, is the only major host to publish transcripts of each show. While there are several such outlets on the right, there is no show with comparable reach on the left.

categorized as centrist unless they have open partisan leanings. Accordingly, Fox News and Rush Limbaugh were classified as right-leaning while MSNBC was classified as left-leaning, even though not all programming from each outlet may be ideologically coherent with the dominant classification. Finally, I visited all blogs on the list and categorized them based on the content on their front page, including any self-identification (e.g. "A conservative blog" in the site header) as well as the ideological leanings of the top links and blogroll, if evident. Any blogs whose ideological leanings were not evident were classified as centrist.

Once categorized, I calculated the proportion of attention each outlet gave to each issue as a percentage of the entire corpus of articles retrieved from that outlet (controlling for duplicate articles). This controls for varying levels of output: a large metropolitan newspaper, for instance, is likely going to publish more than a blog written by a single person. For instance, 4,244 articles on abortion were retrieved from the *New York Times* during this period, or 2% of their total output across these issues. Using this ratio, a one way Analysis of Variance test was run on each issue, with outlets aggregated to their partisan alignment. In keeping with Hypothesis 2, this test determines the tightness of the overall relationship between agendas within each partisan / non-partisan sphere. The statistical significance of the mean difference was then tested using a Tukey HSD test.

Results

Table 4.1 displays the means and standard deviations of attention to each issue by outlet partisan alignment. Because the overall activity varies disproportionately by

outlet, the actual count of articles per issue is represented as a ratio of each outlet's actual article count divided by the overall number of articles from that outlet in the dataset. So, for example, if Outlet A, a left-leaning outlet, featured 10 articles about abortion out of a total set of 100 articles, the proportional mean for the abortion issue for this outlet would be 0.1. This was then averaged across all outlets in each partisan sphere. Accordingly, Table 4.1 shows the mean proportion of articles across each issue / alignment pairing. The highest mean for each issue is bolded to indicate which partisan grouping afforded it the most attention.

Several issues received considerable attention across outlets, namely Unemployment and Taxes, both of which received more than 10% of coverage across outlet groupings; and Iraq, Crime, and Terrorism, each of which received more than 5% of coverage across outlet groupings. On the other hand, some issues received scant attention (less than 2%) across outlets, including Education reform, Fracking, Labor issues, Reproductive rights, Arab Spring, and Net neutrality. This occurred despite large controversies surrounding Race to the Top and Common Core within the Education Reform issue, Card Check for Labor Issues, controversies surrounding Planned Parenthood, and renewed attention at the FCC to Net Neutrality. Finally, across outlets, left leaning issues constituted 32.75 percent of coverage, right leaning issues were 38.87 percent of coverage, and centrist issues comprised 28.83 percent of all coverage.

Hypothesis 1b posits that left-leaning outlets will address issues that are important to the left at a higher rate than right-leaning or centrist outlets will. Indeed,

all but three of the thirteen issues classified as 'left' issues in this study received a greater proportion of attention among left-leaning outlets than among centrist or right-leaning outlets. For many issues, this reflected a 1/3 or greater increase over centrist or right media coverage. This is particularly evident with poverty related issues like Inequality, which constituted 4.79 percent of left-leaning media's coverage, compared to 3.17 percent for centrist and 2.73 percent for right leaning media; social justice issues like same sex marriage (3.53%, 2.28%, and 1.44% for left, center, and right-leaning media respectively); and gender-related issues like abortion (3.43%, 2.36%, and 2.48%).

Nonetheless, right leaning outlets attended more to two issues expected to receive more coverage in left leaning media. Healthcare reform was covered at nearly double the rate on right-leaning media (8.02%) than on left-leaning media (4.79%). Though not as drastic of a disparity, Racial issues represented almost six percent of coverage on right leaning media and just under five percent on left leaning media (and less than four percent in centrist media). Given the hypothesis' issue categorization, this is surprising, but may be explained in the context of the contemporary media environment, in which opposition to "Obamacare" and racial issues springing in part from the election of an African-American are rampant. Finally, Labor issues were covered slightly more in centrist media than on the left.

Table 4.1. Mean of Coverage for each issue

	Proportion Means (Std. Dev.)		
Issue	**Left**	**Center**	**Right**
Left			
Abortion	3.43 (2.76)	2.36 (2.34)	2.48 (1.62)
Climate Change	3.02 (1.77)	1.48 (0.86)	2.51 (1.8)
Education Reform	1.71 (4.61)	1.37 (1.91)	0.87 (0.97)
Fracking	0.44 (0.38)	0.27 (0.3)	0.29 (0.27)
Healthcare Reform	4.27 (1.96)	3.19 (2.62)	8.02 (6.09)
Inequality	4.79 (1.97)	3.17 (1.51)	2.73 (1)
Labor	1.11 (0.86)	1.46 (4.04)	1.22 (1.26)
Medicare	3.83 (1.77)	2.59 (1.74)	2.71 (2.1)
Race	4.9 (1.8)	3.44 (2.55)	5.94 (5.17)
Reproductive Rights	1.28 (0.9)	0.69 (0.4)	0.91 (0.59)
Same Sex Marriage	3.53 (3.95)	2.28 (2.21)	1.44 (0.87)
Social Security	3.01 (1.36)	1.95 (1.1)	1.93 (1.2)
Welfare	2.74 (0.8)	2.1 (0.85)	2.71 (1.1)
Right			
Afghanistan	4.48 (2.74)	5.84 (4.23)	4.37 (2.32)
Crime	7.46 (3.76)	10.68 (6.18)	8.35 (4)
Deficit	4.52 (2.3)	4.31 (3.78)	4.2 (1.81)
Drugs	3.12 (2.06)	4.79 (2.97)	2.87 (1.96)
Gun Control	1.76 (1.16)	1.87 (1.24)	2.52 (1.73)
Immigration	2.4 (1.12)	2.3 (1.25)	3.04 (2.07)
Iraq	5.22 (3.25)	6.05 (5.55)	4.62 (2.51)
Terrorism	6.04 (3.25)	6.95 (3.56)	8.84 (5.89)
General			
Arab Spring	0.82 (1.05)	0.79 (0.71)	0.9 (0.92)
Net Neutrality	0.17 (0.1)	0.13 (0.19)	0.14 (0.25)
Taxes	13.31 (4.34)	14.83 (4.76)	14.2 (4.41)
Unemployment	12.78 (4.91)	15.96 (6.57)	12.47 (4.37)

Hypothesis 1c offers a corollary prediction: that right-leaning media would attend to right-wing issues more than other outlets would. The dynamic among these issues was markedly different than the one for left-leaning issues. Among these issues, right-leaning media only attended to Gun control, Immigration, and Terrorism at a higher rate than other media. Instead, foreign policy issues surrounding Iraq and Afghanistan and coverage of Crime was higher in centrist media (6.05%, 5.84%, and 10.68%, respectively) than in right-leaning media (4.62%, 4.37%, and 8.35%). Left-leaning media only attended to one right-wing issue – Deficit – at a higher rate than right-leaning media, although the difference was minimal (just 0.3 %).

It is interesting that some foreign policy issues – namely Iraq and Afghanistan – receive more coverage in centrist media than right leaning media while Terrorism exhibited the opposite dynamic. This may have been a consequence of real world events: during this period, President Obama committed higher number of troops to Afghanistan as part of the "surge" strategy and also oversaw the withdrawal of combat troops from Iraq. Over the same period, however, there was only a single major terrorist attack on American soil (the Boston Marathon bombing in April 2013). Coverage in right-leaning media, then, may have been less about specific incidents and more about the more general threat of terrorism. On the other hand, the preponderance of the coverage of Crime in centrist media as compared to other outlets may reflect the responsibility many local newspapers have to cover incidents within their communities; partisan media often do not share these journalistic

responsibility or foci. Determining if this is the case would require closer interrogation of the data, however, and is therefore outside the scope of this paper.

Additionally, Hypothesis 1d expects that more general issues will be covered by centrist outlets or be equally dispersed across outlets. Economic issues like Taxes and Unemployment were indeed covered more by centrist outlets than others, although the difference between outlets on the Taxes issue was relatively slim (13.31%, 14.83%, and 14.2% for left, center, and right media, respectively). Arab Spring and Net Neutrality both received very little, and relatively uniform, attention across outlet groupings.

According to Hypothesis 2, there should be very little variance across issues within each partisan sphere. A one-way ANOVA test was used to determine whether the difference in means for each issue was due more to within group variation or between group variation. Higher F-Test values in the ANOVA test indicate that the variation in the means between partisan spheres is higher than the variation in the mean within the sphere. Consequently, higher F-Test values highlight issues in which the partisan spheres are tightly coupled and distinct from other spheres.

Table 4.2 shows the results of that analysis. In addition to the standard reported significance levels, Table 4.2 also reports significance at the 0.1 level in order to show slightly less significant but still potentially meaningful levels.[10] The left side of

[10] There is considerable debate as to how conservatively such results should be reported. On the one hand, greater range gives the researcher more latitude in finding potentially significant results. However, given the large number of statistical tests run (100, including all Tukey HSD tests), some would call for a Bonferroni test to correct for Type I errors, or errors of identifying significance that exist purely from chance. Given the large number of statistical tests in this model, there is a high chance of such errors occuring. Bonferroni tests aggregate the statistical comparisons into one family,

the table displays the total sum of the squares of the difference between the observation and the mean within each partisan group (Left, Right, and Center) by outlet in the Sum of Squares column, the sum of means between groups in the Mean of Squares column, and the results of an F-test that determines if the differences between the two are the consequence of tight integration or statistical noise. The right side of the column shows the results of a Tukey's Honest Significant Difference (HSD) test, which uses pairwise tests between groups to determine the source of any significance in the ANOVA test. There are three tests included: difference between Left and Center means, Right and Center means, and Left and Right means. Issues are grouped according to whether or not they should be left, right, or general issues, according to Hypothesis 1.

Table 4.2 indicates that several issues exhibit signs of distinct partisan agendas. Statistically distinct agendas emerge on several left-leaning issues, including Climate Change, Healthcare reform, Inequality, Reproductive Rights, Social Security (all significant at the 0.001 level), Same Sex Marriage, Welfare, Drugs, Unemployment (all significant at the 0.01 level), Medicare, Crime, and Terrorism (significant at the 0.05 level). Additionally, there is marginally significance in agenda difference for Fracking, Gun Control, and Immigration (0.10 level; most were between 0.05 and 0.055). Nine of the 13 left-wing issues were significant to at least the .05 level, while

in this case, a family with 100 comparisons. Such tests lower the significance level according to the number of comparisons made. This is not performed in this study but could be included in future analysis.

just three of the right-wing issues and only one centrist issue exhibited similar significance.

Table 4.2. ANOVA and Tukey Test Results

Issue	Sum of Squares	Mean of Squares	F-Test	Post Hoc Test - Difference: Left-Center	Post Hoc Test - Difference: Right-Center	Post Hoc Test - Difference: Right-Left
Left						
Abortion	0.00209	0.00104	2.086	0.011	0.001	-0.01
Climate Change	0.00442	0.00221	10.17 ***	0.015 ***	0.010 ***	-0.01
Education Reform	0.00113	0.00057	0.819	0.003	-0.005	-0.01
Fracking	0.00005	0.00003	2.756 ^	0.002 ^	0.001	0.00
Healthcare Reform	0.04979	0.0249	15.06 ***	0.011	0.048 ***	0.038 **
Inequality	0.00693	0.00347	15.63 ***	0.016 ***	-0.004	-0.021 ***
Labor	0.00023	0.00011	0.149	-0.003	-0.002	0.00
Medicare	0.00287	0.00143	4.06 *	0.013 *	0.001	-0.011 ^
Race	0.0129	0.00645	5.101 **	0.0146	0.025 **	0.01
Reproductive Rights	0.00058	0.00289	7.651 ***	0.006 ***	0.002	-0.004 *
Same Sex Marriage	0.00666	0.00333	5.545 **	0.013	-0.008	-0.021 **
Social Security	0.00206	0.00103	7.409 ***	0.001 **	-0.001	-0.001 **
Welfare	0.00103	0.00051	5.861 **	0.006 *	0.006 *	0.00
Right						
Afghanistan	0.00512	0.00256	2.309	-0.013	-0.014	0.00
Crime	0.1918	0.00959	3.928 *	-0.031 *	-0.023	0.01
Deficit	0.00015	0.0001	0.091	0.002	-0.001	0.00
Drugs	0.00874	0.00437	7.243 **	-0.017 **	-0.019 ***	0.00
Gun Control	0.00119	0.00059	2.977 ^	-0.001	0.007 ^	0.008 ^
Immigration	0.00124	0.00062	2.638 ^	0.001	0.008 ^	0.01
Iraq	0.00401	0.00201	1.14	-0.008	-0.014	-0.01
Terrorism	0.01336	0.00668	3.387 *	-0.009	0.019	0.028 *
General						
Arab Spring	0.00003	0.00001	0.173	0.001	0.001	0.00
Net Neutrality	0	0	0.483	0.001	0.001	0.00
Taxes	0.0382	0.00191	0.926	-0.015	-0.006	0.01
Unemployment	0.0298	0.015	4.905 **	-0.032 ^	-0.035 *	0.00

Significance: *** - 0.001; ** - 0.01, * - 0.05, ^ - 0.1

The results of the Tukey HSD Post Hoc Test indicate which outlet groupings are responsible for the differences in the F-Test; i.e. which issues receive more similar coverage within outlets in the left, right or center than between those ideological groupings. These tests show that coverage of Climate Change, Welfare and Drugs is statistically similar on right and left leaning media, with centrist media covering the issue at a lower rate. Such results suggest that these issues may be uniformly partisan. Alternately, Inequality, Reproductive Rights, and Social Security are all covered at a statistically higher rate among left-wing media than centrist or right-wing media, indicating that these issues may be the domain of left-wing media, as hypothesized. On the other hand, Healthcare reform is covered at a statistically significant higher rate in right-leaning media than in centrist or left-leaning media, where coverage rates are largely similar (Gun control, while very marginally significant, exhibits a similar pattern). Finally, Race and Unemployment are largely similar between left-leaning and centrist outlets, but right-leaning outlets cover these issues at a higher rate.

As discussed above, many of these issues were controversial during this period. As global temperatures have risen, Climate Change has become a more important issue for environmentalists, and this may have resulted in pushback from right-wing media. After years of being a side issue, gun control was brought back to the forefront of the national agenda by several mass shootings, including the attack on Sandy Hook Elementary School in December 2012. That attention to this issue was largely uniform (with marginally significant increase in right leaning media) reflects the

widespread debate this incident, as well as ancillary concerns like the Fast and Furious issue, caused. Also during this period, widespread concerns about inequality led to the Occupy Wall Street protests, a left wing movement to draw attention to rising income inequality and related issues. Similarly, left wing media scrutinized the Susan G. Komen Foundation, which was created to combat breast cancer, for their refusal to fund Planned Parenthood outlets as well as the effect of the Affordable Care Act on access to birth control. The heightened interest in these issues in partisan media may be a consequence of the controversy surrounding these issues and the renewed focus within specific partisan circles on them.

Discussion & Conclusions

Scholars have known for some time that different media frame issues in different ways, and numerous studies have investigated partisanship's effect on framing. This study asked whether the coverage itself differed between outlets. Specifically, it hypothesized that partisan outlets will emphasize those issues that are important ideologically or that support some partisan goal. On the left, these include issues of social justice and intergroup relations. The right, however, was expected to emphasize issues of law and order and social justice. All other issues were expected to be given more attention in centrist media or somewhat equal attention across outlets. Across outlets, then, this could create a distinct agenda for each partisan grouping.

The results indicate that when looking at a broad range of issues, distinct agendas emerge across partisan outlets, with left-leaning outlets particularly adept at

covering an array of left-wing issues at a uniform rate. This confirms the notion of a partisan agenda sphere among media, with left-leaning media standing out as especially uniform. Particularly controversial issues seem to have a higher presence in partisan media than in centrist media, suggesting that centrist media only attends to these issues once they spill over from partisan media. Very few issues, on the other hand, received more attention in centrist media than in partisan media; these are largely limited to major conflict-driven foreign policy issues and potentially local issues like crime coverage.

The most interesting of these results, however, may be the traditionally left-leaning issues the right spent more of its time and space discussing: Healthcare reform and Race related issues. Healthcare reform may be the consequence of the Republican Party's continued attempts to repeal the Patient Protection and Affordable Care Act, popularly known as Obamacare. The higher rate of attention to this issue, then, may be tied to the importance of this issue among right-leaning partisans as a symbol of the flaws of the current administration. The Right's attention to Racial issues is more difficult to explain, but it may be a consequence of increased scrutiny such issues could receive under an African-American President.

These findings are important for several reasons. As media fragment, and people isolate themselves from traditional media in favor of alternate, more partisan sources, their view of the world may diverge from the views their less partisan peers hold. In fact, this is one of the fundamental assumptions of selective exposure: that as media fragment, people who self-select into partisan media will interpret issues

differently than other citizens. If the influence inherent in agenda setting theory hold true – namely that people believe that issues with higher coverage in the media are more important – this could result in varying expectations citizens hold for their elected officials in terms of the issues they should address. Furthermore, this may have an adverse effect on policymaking: as broad segments of the public start prioritizing issues differently, the national discussion about how to solve the nation's problems becomes more difficult to even begin, and elected officials may be unable to agree which issues to which limited resources should be devoted.

A similar effect is also exerted on agenda setting theory. Because agenda setting theory depends upon the public largely receiving the same issue set, as media and public attention continue to fragment, the power of this mechanism is diminished across the broader public. Accordingly, the differences between outlet types suggest that agenda setting studies cannot study just one or two outlets but should draw upon an ideologically diverse range of outlets. Hopefully, as the methods to accommodate the complex feedback cycles of agenda relationships between different segments of the media and the public develop, scholars will be better able to explain this phenomenon.

Several questions remain from this research. First, there is likely considerable interaction between partisan spheres, as partisan outlets engage with their counterparts and attempt to reshape or influence the coverage of centrist media (who have the broadest reach). It is also likely that the form of media – broadcast, traditional newspaper, blog – shapes the agenda profile of each outlet, but that is not

studied here. Finally, the effect of these findings on partisans who engage in selective exposure is likely the most important area of future research, as it holds the most potential to influence democratic processes.

Chapter 5:
Conclusions

In his mammoth survey of nascent American culture, Alexis de Tocqueville recognized the community newspaper as crucial to the organization and vocalization of public opinion:

> The effect of a newspaper is not only to suggest the same purpose to a great number of persons, but to furnish means for executing in common the designs which they may have singly conceived. …[I]t frequently happens that a great number of men who wish or who want to combine cannot accomplish it because as they are very insignificant and lost amid the crowd, they cannot see and do not know where to find one another. A newspaper then takes up the notion or the feeling that had occurred simultaneously, but singly, to each of them. All are then immediately guided towards this beacon; and these wandering minds, which had long sought each other in darkness, at length meet and unite. The newspaper brought them together, and the newspaper is still necessary to keep them united (de Tocqueville, 1835).

In de Tocqueville's view, mass media therefore serve as a focusing mechanism, coordinating latent public opinion into action. It suggests a media responsive to shifts in public opinion that can focus those swings to persuade other parts of the public. This may have been true in the early 1800s, when de Tocqueville was crisscrossing the Eastern U.S., and when newspapers across the political spectrum proliferated. Those newspapers were not mass-oriented, instead often appealing to niche audiences, whether local, partisan, or pursuing narrow interests (Williams & Delli Carpini, 2011).

Agenda Setting

This picture of a responsive media is sharply different from the one painted by McCombs and Shaw in 1972. By this point, the often global nature of the news, mass

media consolidation, and norms of objectivity and journalist practices had created large, national news organizations that guided public opinion instead of responding to it. Yet, as this dissertation has shown, technological changes in the last few decades, most prominently the rise of the Internet and forms of self-expression, have led to a media environment that is far more similar to de Tocqueville's vision than that of mid-20th century American media.

In the Introduction, I outline the research questions that drove this dissertation. The primary research question asked about these interactions: in particular, what are the alternate pathways besides traditional agenda setting that describe how salience is transferred in the modern era? In Chapter 2, I showed that there were high levels of interactivity between the public and mass media agendas over the time period 2010-2013. This interactivity was not limited to any type of issues, nor was it evident only in specific measures of opinion. In other words, agenda interactivity wasn't constrained to Twitter or blogging, but can be seen broadly in Google searches and Wikipedia pageviews. This suggests there are underlying dynamics at work that are enabling mass media responsiveness.

One element of this interaction that has escaped many researchers looking into agenda setting in the digital media age is the existence of both long and short term influence. In Chapter 2, I theorize that once the public is made aware of the salience of a given topic, attention to that issue is easily reactivated and at higher rates than if the salience had not been triggered in the first place. Notably, the reverse, in which the public agenda influences the mass media over the long term, is only true in two

cases (Arab Spring and Climate Change), although the media is often influenced by itself over the long term. Nonetheless, this explains the continued and recurring attention that several issues have received in recent years.

In Chapter 3, I investigate a few cases (Fracking, Climate Change, and Gun Control) to explore the mechanisms underlying some of the other mass media/public interaction. In the case of Fracking, influence is more frequently statistically significant in the direction of public over mass media. Based on a sampling of blog posts and mass media articles, I show that the public is able to draw media attention to this issue only when it culminated in either some kind of spectacle that could be reported – such as a protest – or governmental action. (Although Inequality was not examined in the case study chapter, it is likely that attention to this issue, which had widespread latent interest from the public, followed a similar pattern of only receiving mass media attention once Occupy Wall Street made the story newsworthy.)

Fracking is a unique issue in that it is representative of an inverse of the media to public transfer of salience associated with classical agenda setting theory. Most issues tested showed bi-directional influence, in which the mass media and public agendas interacted, but that interaction took different forms. In the case of Climate Change, the interaction was both cyclical and influenced by long-term trends. Attention was driven by two forces for this issue. On the one hand, attention was often spurred by the weather, in which harsh winter storms or hurricanes elicited debates over the merits of climate change science; these debates were then picked up

by mass media as a crucial element of the issue for sometimes weeks at a time. On the other hand, both mass media and public attention was drawn to climate change when major official action was taken, like the release of the IPCC's report or Obama's plans for regulating carbon emissions from energy plans. Like Fracking, this suggests that a powerful role remains for elites in drawing attention to an issue.

Several issues followed a unique pattern of bi-directional interaction in which public and mass media attention was drawn suddenly during a moment of crisis, and then often diverted elsewhere once the immediate shock of that crisis had dissipated. I call these Crisis Activation issues. In many cases, the crisis sparks discussion of deeper, underlying issues, which linger in the media even after the public has moved on. In Chapter 3, I study the case of Gun Control, which was almost a non-issue in American politics at the start of 2010, but, after a series of major shootings, gained prominence on the national agenda. In my examination, I unsurprisingly find that the shootings themselves elicit extremely high levels of public attention. This attention quickly descends into partisan mudslinging on Twitter, a trend that gets picked up by the media. Perhaps because there's nothing to add besides disgust at the shootings, or maybe because the partisan rancor of the discussion leaves little space for thoughtful debate, the public turns away quickly, while the media lingers on the issue for several more days, covering the debate among elected officials.

I also asked in the Introduction if current media conditions, particularly fragmentation and polarization, alter agenda setting in any way. As Williams and Delli Carpini describe de Tocqueville's world, media outlets were specialized, often

along partisan lines. Chapter 4 determines whether the agendas of partisan outlets differ from that of non-partisan outlets. I hypothesize that left-leaning outlets are more likely to cover left-leaning issues at a higher rate, right-leaning outlets are more likely to cover right-leaning issues at a higher rate, with centrist outlets covering broad issues. This in turn creates distinct spheres, in which partisan outlets largely cover different issues than their peers from across the aisle.

The analysis demonstrates that, largely, this is correct, but there are some unanticipated exceptions. First, Healthcare Reform and Racial issues, both of which seem to belong more intuitively on the left, are covered at a higher rate among right-leaning outlets than any others. This is surprising until one considers just how contentious these issues have been, and how much of right-leaning activism is linked to repealing "Obamacare" or mistrust of President Obama's background and intentions. Second, in this analysis, left-leaning and right-leaning outlets attention converges on many issues, with lower rates among centrist outlets, which could mean that centrist outlets are staying out of the pitched partisan battles taking place elsewhere.

This separation matters if public attention mirrors these distinctions. Unfortunately, we have evidence from Stroud (2011) and others that members of the public tend to get their news from sources with which they agree (selective exposure); that individuals engage in motivated reasoning to discredit news that contradicts their beliefs (Taber & Lodge, 2006); and that political beliefs, even when accurate, are difficult to change (Nyhan & Reifler, 2010). Consequently, if people live solely off

partisan news – made more likely by selective exposure – the issues they find most salient may diverge sharply from their peers, and no amount of reasoning will change their views.

It is unclear if the increased level of interaction between the mass media and the public is a normative good, either, though increasing the range of voices is usually beneficial. In the mid-20th century, when mass media exerted a more singular influence, it directed public opinion, as de Tocqueville suggests it should. But the people determining what the media covered were frequently limited to a small demographic, and minority political views, as well as the viewpoints of ethnic and religious minorities and women, were often not part of that conversation. Accordingly, the modern ecosystem, which allows everyone with access to the Internet and a minimal level of technical skill the opportunity to voice their opinion, seems to be an improvement from the perspective of an inclusiveness norm.

But what about when the most persuasive are incorrect, as many are on Climate Change? Many of the Tweets uncovered in the case study in Chapter 3 demonstrated a limited understanding of climate science. When the media covers this debate without refuting the bad science, it legitimizes these inaccurate views and makes it more difficult for lawmakers to address a pressing problem. Moreover, while sifting through Tweets and blog posts for these case studies, it was difficult not to note the profanity and name calling that appeared to be common. Even when Tweets were civil, they did not necessarily spur elevated, thoughtful debates, either: although I was not systematic in this analysis, I did not find many Tweets in which people

were trying to persuade others. Instead, it appeared that many were just sharing their views, without engaging with others. This is not deliberation, then, and likely not even the mediating public that Habermas sought (Habermas, 2006).

Finally, it is not clear which voices are receiving attention by mass media. While it was outside the scope of this study, determining if minority voices have more influence than they have had in the past is an important question.

Agenda Setting?

A final caveat to these results is important: it is not clear if these results are reflective of public opinion. In traditional agenda setting studies, the public is measured by surveys that ask about the "most important problem facing the country today;" the media, on the other hand, is measured by the attention it gives an issue. While the approach I apply (and which has become common when measuring online attention) brings face value parity to these distinctive measures, they may actually not be measuring the same phenomenon. On the media side, attention (e.g. article count, or article placement and count) is the most appropriate measure because it is the output that can influence the public. At the same time, though, members of the public do not always show in a measurable way which issues are most important. For example: I may think climate change is among the most important issues (and I do), but I may not systematically Tweet, blog, or search about the issue every time I think of it. Climate Change therefore holds a latent salience that is immeasurable via the methods employed here, despite the methodological advantages they offer in other

ways. Future research will need to untangle this problem and determine how well online behavior aligns with opinions on salience.

Limitations

No study, not even ones with as many data points as this dissertation, can address every possible related research question or overcome all statistical and data hurdles. In fact, the statistical and data requirements of this dissertation posed several unique challenges and actually limited the scope substantially.

In its initial design, this project included as a central research question the effects of technological change on agenda setting. Answering this question would have required collecting news data from 1990 onward, and adding measures of public opinion as they became available. Once the project was approved, I happily set off on a project to collect mass media data from Lexis Nexis using a custom-written python script. I actually gathered quite a bit before Lexis Nexis turned off access and the library discouraged me from continuing this plan. I concluded then that I should only include mass media data for the time period in which I had public data.

Acquiring public data also was not an easy task. I initially wanted to include blog posts from 2002, when blogs started to become mainstream; Google search trends from 2004, the earliest Google makes available; Wikipedia page views from 2007 on (also the earliest available); Tweets from 2009 on, which is when CNN announced they had a million followers; and Gallup Most Important Problem survey results across the entire time frame. Many of the blog aggregation sites, such as blogPulse, which tracked blogger topics, had been shuttered or stopped being updated

by the time I started this project. Instead, I wrote a few scripts to scrape individual blogs as well as results from Google blog search, but many large blogs no longer existed, and Google blocked my IP address. Finally, I turned to data companies. After 6 months of talking with several of the industry leaders and entering into negotiations with some of them, I was finally able to land a contract with Crimson Hexagon thanks to the support of Professors Bruce Bimber and Barbara Harthorn of UCSB's Center for Nanotechnology.

After much debate and exploration of the available data, I settled on a 2010-2013 time frame. However, while Crimson Hexagon offered daily Tweet, media, and blog counts, it placed limits on the amount of Twitter data that could be downloaded in a day, which meant I had to rely on the counts they provided and not develop a more sophisticated textual analysis of this data.

Nonetheless, data in hand (or, more appropriately, filling up an external hard drive and accompanying cloud storage), I set about analyzing it. Having never taken a class in time series analysis, these methods were daunting. Moreover, the lag structure of the data was confounding: whereas most econometric analysis employed just a one, two, or three day structure, I quickly found that my data sometimes utilized a 60 or 90 day lag structure. While this ultimately led me to the theoretical model and method employed in Chapter 2, it precluded the use of models that may have more accurately described this data, such as vector autoregression (although this may have value in future analysis) or Brandt's Bayesian analysis (Brandt & Sandler, 2012).

The aggregation process also limited this analysis. Because I analyzed each data source at the daily level, I obscured the complex interactions that may occur at the intra-day level (such as hourly or quarter hourly analysis), particularly between Twitter and broadcast and online media. Accordingly, the results reported herein likely underrepresent the level of interaction that actually occurs. Aggregation at the daily level also limited me in the opposite direction as well, as it forced me to exclude Gallup polling from the analysis, which is only available at a monthly level. Without interpolating survey results to cover the days in between, a process that itself could have led to spurious results, they simply could not be compared with other measures of public opinion. Finally, the complex process for aligning Google searches across days relied on several assumptions for how this data is calculated that may have been inaccurate.

Outside the data, the inadequacies of time and skills inherent in being a graduate student were limiting as well. Given another year, or two, or three maybe, many of the above methodological problems may have been solved. For instance, the data is not normally distributed and thus has heteroscedasticity in the error term. To correct for this, I should have used some variant of a Generalized Autoregressive Conditional Heteroscedastic (GARCH) model, but did not have time to research and learn how to utilize these methods. I also could have answered the call of many secondary research questions (discussed more below) that sparked my curiosity. However, I believe the results I have reached are a good first step at answering the

broad research questions I asked in the introduction, especially given those limitations.

Future Research

There are dozens of potential research questions that can be pursued with this dataset or with some augmentation. In this section, I will briefly describe a few of the projects I find most interesting.

Methods Comparison. On the methodological side, I would like to determine which methods provide the most parsimonious explanation of agenda setting interaction. This may be similar to a 2014 article which compared several methods, including Poisson autoregression (PAR), based on Brandt's 2001 article; however, this piece does not account for the kind of lag structure I found (Fogarty & Monogan, 2014). In this future piece, I would include PAR, an update to this method that includes Bayesian analysis (Brandt & Sandler, 2012), machine learning methods, as well as more traditional methods like the one I used, vector autoregression, or GARCH.

Shorter Time Cycles. This analysis aggregated data to the daily level, in part because that is the level at which Google searches and Wikipedia page views are available. Yet it is clear from the case study analysis in Chapter 3 that this is too long of a time frame to capture this interaction; instead, one hour or maybe even 15-minute intervals should be used. This would require much more detailed data, however.

Role of elites. My case studies showed that there remains a powerful role for elites in the mass media-public relationship, but the details of how elites guide

attention were not part of this analysis. Do elites interpret issues for the public outside of media? Through media? How effective are they are revisiting an issue and reactivating latent attention? A study like this would integrate public speeches, interviews, and social media updates from political elites into this analysis.

In-Depth Case Studies. The case studies here were constrained by space, time, and the limitations Crimson Hexagon places on downloads of social media data. Without the latter limitation, I could use text analysis to determine which elements (frames or components) of the issue are receiving the most attention in the public as well as how that attention waxes and wanes. Additionally, I could determine which media sources were driving most of this coverage. This would answer a multitude of questions; perhaps the most interesting to me is determining how much influence partisan sources have on the public.

Public Understanding. Along with the case studies, I am curious how much the public actually understands the issues to which it is attending. This is particularly the case with science based issues like Climate Change, which my case study (as well as numerous polls) showed was poorly understood by many of the people Tweeting about it. How does this limited understanding shape attention? How does it influence media attention?

Concluding Thoughts

As the set of sample research studies above suggests, there is much more work that can be done with this data, and, more broadly, to explain the evolving relationship between the mass media and the public. It is likely that this snapshot will

only explain a brief moment in time: that some new app or infrastructure that is just a glimmer in some developer's eye in Silicon Valley will upend the media ecosystem once again. It will be important to understand how we got to that point, though. I look forward to the research that I, as well as my colleagues studying political communication around the globe, offer to explain these phenomenon.

Appendix A:
Issues and Search Terms

Issue	Keyword
Left	
Abortion	abortion or roe or personhood
Climate Change	"climate change" OR "global warming" OR "cap and trade" OR "carbon tax"
Education Reform	"education reform" OR "charter school" OR "test scores" OR "race to the top" OR "no child left behind"
Fracking	fracking OR "hydraulic fracturing"
Healthcare Reform	"healthcare reform" OR obamacare OR "socialized medicine" OR "individual mandate" OR "employer mandate"
Inequality	inequality OR poverty OR "minimum wage"
Labor	"labor union" OR "union membership" OR ("card check" AND union) OR "right to work" or (union AND strike AND NOT "european union")
Medicare	medicare
Race	racial OR racism OR racist
Reproductive Rights	"birth control" OR "morning after pill" OR "planned parenthood"
Same Sex Marriage	"gay marriage" OR "same sex marriage" OR "civil union" OR "traditional marriage"
Social Security	"social security"
Welfare	welfare OR "food stamps"
Right	
Afghanistan	Afghanistan OR (war AND Afghanistan)
Crime	crime or criminal
Deficit	"federal deficit" OR "deficit reduction" OR "fiscal cliff" OR sequester OR ((debt OR deficit) AND (gdp OR Obama OR congress))
Drugs	drugs OR legalization OR "drug abuse" OR "drug addiction"

Gun Control	"gun control" OR "assault weapon ban" OR "background check" OR NRA OR "national rifle association" OR "second amendment" OR "2nd amendment"
Immigration	immigration OR "immigration reform" OR "dream act" OR "illegal immigrant" OR "illegal alien" OR "undocumented worker"
Iraq	Iraq OR (war AND Iraq)
Terrorism	terrorism OR terrorist OR "bin laden" or qaeda
General	
Arab Spring	"Arab Spring" OR "Arab Awakening" OR tahrir
Net Neutrality	"net neutrality"
Taxes	taxes OR "tax cut"
Unemployment	unemployment

Appendix B:
Outlets

Type	Outlet	Alignment
Broadcast	ABC	C
Blog	Althouse	C
Blog	Americablog	L
Blog	American Thinker	R
Blog	Daily Dish	C
Newspaper	Associated Press	C
Newspaper	Arizona Republic	R
Newspaper	Atlanta Journal-Constitution	L
Blog	Balkin	C
Blog	Balloon Juice	L
Online News	Breitbart News	R
Online News	Business Insider	C
Blog	Cato Blog	R
Broadcast	CBS	C
Newspaper	Chicago Sun-Times	C
Newspaper	Chicago Tribune	C
Broadcast	CNN	C
Blog	Crooks and Liars	L
Online News	Daily Beast	C
Online News	Daily Caller	R
Blog	Daily Kos	L
Newspaper	Dallas Morning News	C
Blog	Brad DeLong	L
Newspaper	Denver Post	C
Newspaper	Detroit Free Press	C
Blog	Digbys Blog	L
Blog	Director Blue	R
Online News	Drudge Report	R
Blog	Firedoglake	L
Online News	Five Thirty Eight	L
Online News	Forbes	C
Online News	Foreign Policy	C
Blog	Heritage Blog	R
Newspaper	Houston Chronicle	R
Online News	Huffington Post	L
Blog	In These Times	L

Blog	Joshua Pundit	R
Blog	Juan Cole	L
Newspaper	Kansas City Star	C
Blog	Keith Hennessey	C
Newspaper	LA Times	C
Newspaper	Las Vegas Review-Journal	C
Blog	Legal Insurrection	R
Blog	Media Matters	L
Blog	Media Research Center	R
Blog	Michelle Malkin	R
Newspaper	Minneapolis post	C
Online News	Mother Jones	L
Broadcast	MSNBC	L
Online News	National Journal	C
Online News	National Review	R
Broadcast	NBC	C
Newspaper	New Hampshire Union Leader	C
Newspaper	Newsweek	C
Blog	Nece Deb	R
Blog	No More Mister	L
Broadcast	NPR	L
Newspaper	NY Post	R
Newspaper	NY Times	C
Blog	Outside the Beltway	C
Blog	Patt Dollard	R
Newspaper	Pittsburgh Post-Gazette	C
Blog	PJ Media	R
Blog	Political Wire	C
Online News	Politico	C
Blog	Politics and Finance	R
Blog	Powerline Blog	R
Blog	Prospect	L
Online News	Real Clear Politics	C
Online News	Reason	R
Blog	Red State	R
Blog	Riehl World View	R
Blog	Right Wing Watch	L
Newspaper	Sacramento Bee	C
Online News	Salon	L

Newspaper	San Diego Union Tribune	R
Newspaper	San Jose Mercury News	C
Newspaper	Seattle Post-Intelligencer	C
Online News	Slate	C
Newspaper	St. Louis Post-Dispatch	C
Blog	Sultan Knish	R
Online News	Talking Points Memo	L
Online News	The Atlantic	C
Online News	The Blaze	R
Online News	The Daily Beast	C
Newspaper	The Daily Oklahoman	R
Blog	Think Progress	L
Newspaper	Time	C
Blog	Total Capitol	C
Blog	Townhall	R
Newspaper	USA Today	C
Blog	VA Right	R
Blog	Volokh Conspiracy	C
Newspaper	Wall Street Journal	R
Online News	Washington Monthly	L
Newspaper	Washington Post	C
Newspaper	Washington Times	R
Blog	White House Dossier	R
Blog	Zero Hedge	C

Appendix C:
Agenda Setting Studies and their Sources

Citations	Article	Sources	Intermedia
5833	McCombs & Shaw 1972	Local and national	Y
1058	Dearing & Rogers 1996	unavailable	
651	Iyengar & Simon 1993	ABC News	
531	Erbring et al. 1980	94 newspapers	
502	Behr & Iyengar 1985	CBS news	
437	Weaver, Graber, McCombs, Eyal 1981	4 local newspapers and	
326	McLeod et al. 1974	Local - a liberal and a conservative journal	Y
325	Cook et al., 1983	Experiment; 2 tv programs	
318	McCombs et al. 1997	2 local newspapers and 1 tv news station	
291	Winter and Eyal 1981	New York Times	
286	Wanta, Golan, Lee	ABC, CBS, CNN, NBC	
260	Ader 1995	New York Times	
246	Althaus & Tewksbury 2002	Online and paper versions of New York Times	
246	Brosius & Kepplinger 1992	4 major German network news	
218	Neuman 1990	New York Times, Readers Guide Index	
213	Benton& Frazier 1976	Local newspapers, Time, Newsweek, three broadcast networks	
182	Roberts & Wanta 2002	New York Times, AP, Reuters, Time, CNN	
157	Kiousis 2004	New York Times	
157	Soroka 2002	Canada; 7 English newspapers and one French one	

144	Palmgreen and Clarke 1977	1 local newspaper, ABC, CBS, NBC, local newscasts	
143	Shaw & Martin 1992	1 newspaper	
139	Wanta and Hu 1993	New York Times, ABC, CBS, NBC Newscasts	
138	Kiousis & McCombs 2004	Washington Post, New York Times, LA Times, Newsweek, US News & World Report, ABC, CBS News	
135	Atwater et al. 1985	Three local newspapers	
135	Zhu 1992	New York Times, ABC, CBS, NBC Newscasts	
126	Wallsten 2007	New York Times	
122	Lopez-Escobar et al. 1998	2 local newspapers, 1 television network	
118	Walgrave et al. 2008	3 Flemish newspapers, 2 Walloon newspapers; 2 tv channels	
116	Yagade & Dozier 1990	Time magazine	
112	Meraz 2009	New York Times, Washington Post	
111	Stone & McCombs	Time, Newsweek	
110	Hester & Gibson 2003	ABC, CBS, CNN, Fox, NBC; NY Times, USA Today, WSJ; Chicago Sun-Times, Atlanta Journal-Constitution	
107	Gilberg, et al., 1980	Washington Post, New York Times, ABC, CBS, NBC	
101	Brosius & Weimann 1996	4 major German network news	
101	Dalton et al. 1998	46 newspapers	
100	Tipton 1975	3 local newspapers, 2 local tv broadcasts, 3 local radio broadcasts	
100	Wanta and Wu 1992(Interpersonal Communication)	National ABC News, local ABC News, 2 local newspapers	

97	Golan 2006	New York Times, ABC, CBS, NBC Newscasts	Y
95	Sweetser et al., 2008	ABC, CBS, CNN, Fox, NBC	Y
94	McClure & Patterson 1976	network news and unspecified newspapers	
88	Kiousis et al. 2006	unavailable	
87	Wanta & Hu 1994	ABC News, local ABC news, 2 local newspapers	
84	Demers et al. 1989	ABC, CBS, NBC	
82	Boyle 2001	New York Times, Washington Post, LA Times, ABC, CBS, CNN, NBC	
79	Kleinnijenhuis & Reitberg	3 newspapers	
75	Wanta & Foote 1994	unavailable	
69	Tsfati 2003	NY Times, WSJ, Washington Post, Washington Times; ABC, CBS, NBC News	
68	Lasorsa and Wu 1990	New York Times, local newspaper, ABC News, Newsweek	
62	Zhu et al. 1993	New York Times, ABC, CBS, NBC Newscasts	
62	Dunaway, et al., 2010	24 Local newspapers	
61	Craft & Wanta 2004	2 local newspapers and ABC, CNN	
60	Lim 2006	3 online newspapers	
59	Yang & Stone 2003	5 papers: WSJ, NYT, USAT, Chicago Tribune, 1 local; ABC, NBC, CBS; Time, Newsweek, US News & World Report	
55	Lee 2007	New York Times, CNN, Associated Press, Time	Y
50	Weaver 1994	unavailable	
49	Gonzenbach 1992	New York Times	

44	Henry & Gordon 2001	1 newspaper	
36	Sayre et al. 2010	8 California newspapers	
33	Tan & Weaver 2007	New York Times	
31	Uscinski 2009	ABC, CBS, NBC	
27	Meraz 2011	New York Times, Washington Post	
25	Ragas & Kiousis 2010	Left: The Nation; Right: Weekly Standard & National Review	
15	Messner & Garrison 2011	NY Times, Washington Post, LA Times, Christian Science Monitor, USA Today; ABC, CBS, CNN, NBC, Fox News	

Appendix D:
Python Script: Lexis Nexis Scraping

File: grabNews.py

```
# Note: This script no longer functions due to a January 2014 update
to the LN site.
from selenium import webdriver
from selenium.webdriver.support.ui import Select, WebDriverWait

import os
import sys
import re
import time, datetime
from datetime import timedelta
import calendar
import random
import logging
import argparse
import re

strBasePath = '/Volumes/Data/'
strNoResults = 'No Documents Found'
strTooManyResults = 'More than 3000 Results'
FirstStartDate = datetime.datetime.now()
FinalEndDate = datetime.datetime.now()

def HalfDate(startDate, endDate):
    print "Too many results.  Doing a search on half that."
    # take the difference between start and end date and reduce by
half
    dtStartDate = datetime.datetime.strptime(startDate, '%m/%d/%Y')
    dtEndDate = datetime.datetime.strptime(endDate, '%m/%d/%Y')
    delta = dtEndDate - dtStartDate
    HalfwayDay = delta.days / 2
    dtNewEndDate = dtStartDate + timedelta(days=HalfwayDay)
    newEndDate = dtNewEndDate.strftime('%m/%d/%Y')

    dtNewStartDate = dtNewEndDate + timedelta(days=1)
    newStartDate = dtNewStartDate.strftime('%m/%d/%Y')

    return {'FirstStart': startDate, 'FirstEnd': newEndDate,
'SecStart': newStartDate, 'SecEnd': endDate}


def DoSearch(driver, searchString, startDate, endDate):
    print "Searching '" + searchString + "' from " + startDate + "
to " + endDate
    Connect(driver)
    NavToSearch(driver)
    PerformSearch(driver, startDate, endDate, searchString)
    # Test to see if we got to the results page
    try:
        ClickDownloadButton(driver)
    except Exception, e:
```

```
        # FIX
        # Either taken to the too many results page or the NO
results page.  Test for that.
        print "Not the results page."

        src = driver.page_source
        text_found = re.search(strTooManyResults, src)
        if text_found:
            print "Too many results found."
            # Taken to the too many results page.  Need to repeat
search, but in half

            newDates = HalfDate(startDate, endDate)
            # FIX: Doesn't get hung up on days with problems.
            if (newDates['FirstStart'] == newDates['SecEnd']):
                # Then we'll just end up in an an endless loop
because we're searching the same day over and over
                logging.warning('Too many results for one day: ' +
newDates['FirstStart'] + "Time: " + str(datetime.datetime.now()))
            else:
                DoSearch(driver, searchString,
newDates['FirstStart'], newDates['FirstEnd'])
                DoSearch(driver, searchString, newDates['SecStart'],
newDates['SecEnd'])
        else:
            print "No results found.  Moving to the next search
dates."
    else:
        SetDownloadSettings(driver, startDate, endDate,
searchString)
        try:
            select = Select(driver.find_element_by_id('delFmt'))
            select.select_by_value('QDS_EF_GENERICTYPE')
        except:
            # Redo Search
            print "Got an error, re-searching."
            DoSearch(driver, searchString, startDate, endDate)

        maxResults = int(RetrieveMaxResults(driver))
        if (maxResults > 0):
            SetupDownload(driver, maxResults, searchString,
startDate, endDate)
        else:
            print "Error: no results found in download window"


def SearchLexisNexis(driver, searchString, startDate, endDate):
# Set up iterating over each
#     dtStartDate = datetime.datetime.strptime(startDate, '%m-%d-
%Y')
#     dtEndDate = datetime.datetime.strptime(endDate, '%m-%d-%Y')
    dtStartDate = datetime.datetime.strptime(startDate, '%m/%d/%Y')
    dtEndDate = datetime.datetime.strptime(endDate, '%m/%d/%Y')
    startDay = dtStartDate.day
    currYear = dtStartDate.year
```

```
    currMonth = dtStartDate.month
    endYear = dtEndDate.year
    endMonth = dtEndDate.month
    while (currYear, currMonth) <= (endYear, endMonth):
        # If in the first month of the string, want to start at the
date specified
        if ((currMonth == dtStartDate.month) and (currYear ==
dtStartDate.year)):
            strStartDay = str(startDay)
        else:
            strStartDay = "1"
        strStartDate = str(currMonth) + "/" + strStartDay + "/" +
str(currYear)
        # Same goes for the last month
        if ((currMonth == dtEndDate.month) and (currYear ==
dtEndDate.year)):
            strLastDay = str(dtEndDate.day)
        else:
            strLastDay = str(calendar.monthrange(currYear,
currMonth)[1])
        strEndDate = str(currMonth) + "/" + strLastDay + "/" +
str(currYear)

        #Perform Search
        DoSearch(driver, searchString, strStartDate, strEndDate)

        # Very rudimentary attempt to not look like a bot.
        time.sleep(random.randrange(0, 20))
        currMonth += 1
        if currMonth > 12:
            currMonth = 1
            currYear += 1


def Connect(driver):
    driver.get("http://www.lexisnexis.com/hottopics/lnacademic/?")


def NavToSearch(driver):
    driver.switch_to_frame("mainFrame")
    driver.find_element_by_id("news").click()
    driver.implicitly_wait(200)
    time.sleep(5)
    driver.find_element_by_link_text("Newspapers & Wires").click()
    time.sleep(4)
    driver.find_element_by_id('140954').click()
    driver.find_element_by_id('8411').click()



def PerformSearch(driver, startDate, endDate, searchString):
    select = Select(driver.find_element_by_id('dateSelector1'))
    select.select_by_value('from')

    driver.find_element_by_id("fromDate1").clear()
```

```
    driver.find_element_by_id("fromDate1").send_keys(startDate)

    #driver.find_element_by_id("toDate1").clear()
    driver.find_element_by_id("fromDate1").click()
    driver.find_element_by_id("toDate1").send_keys(endDate)
    #driver.find_element_by_id("terms").clear()
    driver.find_element_by_id("fromDate1").click()
    driver.find_element_by_id("terms").send_keys(searchString)
    time.sleep(random.randrange(0, 10))

driver.find_element_by_css_selector("input[type=\"submit\"]").click(
)


def ClickDownloadButton(driver):
    driver.switch_to_frame(1)
    driver.find_element_by_css_selector("img[alt=\"Download
Documents\"]").click()
    driver.switch_to_window(driver.window_handles[1])


def SetDownloadSettings(driver, startDate, endDate, searchString):
    ResultsFound = False
    while not ResultsFound:
        try:
            select = Select(driver.find_element_by_id('delFmt'))
            select.select_by_value('QDS_EF_GENERICTYPE')
            ResultsFound = True
        except:
            print "There was an error when trying to download.  Re-
running the current search."
            Connect(driver)
            NavToSearch(driver)
            PerformSearch(driver, startDate, endDate, searchString)
            ClickDownloadButton(driver)
            time.sleep(random.randrange(0, 10))


def RetrieveMaxResults(driver):
    txt = driver.find_element_by_id('docText').text
    re1 = '.*?'    # Non-greedy match on filler
    re2 = '\\d+'    # Uninteresting: int
    re3 = '.*?'    # Non-greedy match on filler
    re4 = '(\\d+)'    # Integer Number 1

    rg = re.compile(re1 + re2 + re3 + re4, re.IGNORECASE |
re.DOTALL)
    m = rg.search(txt)
    if m:
        maxResults = m.group(1)
        print str(maxResults) + " records found"
        return maxResults
    else:
        return -1
```

```
def SetupDownload(driver, maxResults, searchString, startDate,
endDate):
    if (int(maxResults) <= 500):
        # No need to do anything; all should be set
        DoDownload(driver)
    else:
        print "More than 500 results -  need to do this multiple
times."
        currentStart = 1
        currentMax = 500
        i = 0
        while (currentMax <= maxResults):
            i += 1
            print "Pass " + str(i)

            #setup range
            rangeStr = str(currentStart) + '-' + str(currentMax)
            driver.find_element_by_id('sel').click()
            driver.find_element_by_name('selDocs').clear()

driver.find_element_by_name('selDocs').send_keys(rangeStr)

            # Actual Download
            DoDownload(driver)

            # Cleanup, revert to old screen, etc.
            currentStart += 500
            currentMax += 500
            # Make sure we're not asking for more than is there
            if (currentMax > maxResults):
                currentMax = maxResults
                # but this could cause an infinite loop, so provide
a way to exit
                if (currentStart >= maxResults):
                    currentMax += 500

            time.sleep(random.randrange(0, 10))

            if (currentMax <= maxResults):
                Connect(driver)
                NavToSearch(driver)
                PerformSearch(driver, startDate, endDate,
searchString)
                ClickDownloadButton(driver)
                SetDownloadSettings(driver, startDate, endDate,
searchString)


def DoDownload(driver):
    driver.find_element_by_css_selector("#img_orig_bottom > a >
img[alt=\"Download\"]").click()
    driver.find_element_by_partial_link_text('Newspaper').click()
```

```
if __name__ == "__main__":

    parser = argparse.ArgumentParser(prog="GrabNews-Papers")
    parser.add_argument("Issue", help="Issue Name.  Must be single
word.")
    parser.add_argument("SearchTerm", help="Actual Search String")
    parser.add_argument("StartDate", help="Date to start searching.
Use format MM/DD/YYYY.")
    parser.add_argument("EndDate",  help="Date to stop searching.
Use format MM/DD/YYYY.")
    parser.add_argument("-p", "--path", help="Path to save
documents.  Make sure to end in a /.")
    args = parser.parse_args()

    issue = args.Issue
    searchString = args.SearchTerm
    FirstStartDate = args.StartDate
    FinalEndDate = args.EndDate

    print "******************************"
    print "Searching US Newspapers for issue %s" % issue
    print "Using terms:" + searchString
    print "Dates: %s - %s" % (FirstStartDate, FinalEndDate)
    print "******************************"

    if args.path:
        strBasePath = args.path
    '''
    title = sys.argv[1]
    searchString = sys.argv[2]
    startDate = sys.argv[3]
    endDate = sys.argv[4]
    '''
    dlPath = strBasePath + issue
    if not os.path.isdir(dlPath):
        os.makedirs(dlPath)

    # FIX: Added logging
    logging.basicConfig(filename=issue + '.log',
level=logging.WARNING)
    logging.info('Starting search on \'%s\' from %s to %s' % (issue,
FirstStartDate, FinalEndDate))

    fp = webdriver.FirefoxProfile()
    fp.set_preference("browser.download.folderList", 2)
    fp.set_preference("browser.download.manager.showWhenStarting",
False)
    fp.set_preference("browser.download.dir", dlPath)
    fp.set_preference("browser.helperApps.neverAsk.saveToDisk",
"text/plain")
    fp.set_preference("browser.helperApps.alwaysAsk.force", False)

    driver = webdriver.Firefox(firefox_profile=fp)
```

```
    SearchLexisNexis(driver, searchString, FirstStartDate,
FinalEndDate)
```

Appendix E:
Python Script: Scraping Google Blog Search Results

File: grabGoogleBlogs.py

```
from selenium import webdriver
from selenium.webdriver.support.ui import Select, WebDriverWait
from random import shuffle
import csv
import time
import random
import argparse

strBasePath = "./topblogs/"

def NavigateToGoogle(driver):
    driver.get("http://www.google.com/")
    driver.find_element_by_id("gbqfq").clear()

def SetupSearch(driver, strStartDate, strEndDate, strSearchTerm,
simple=False):

    if not simple:
        shuffle(blogTypes)
        btString = ' OR '.join(blogTypes)
        print btString
        print strSearchTerm
        searchString = strSearchTerm + " " + str(btString)

        #driver.find_element_by_id("gbqfq").send_keys("guns" + "
wordpress OR \"movable type\" OR blogspot")
        driver.find_element_by_id("gbqfq").send_keys(searchString +
'\n')
        '''
        try:
            driver.find_element_by_id("gbqfb").click()
        except:
            driver.find_element_by_id("gbqfba").click()
        '''
        time.sleep(random.randrange(4, 15))

    # Click on Search Tools
    driver.find_element_by_id("hdtb_tls").click()
    time.sleep(random.randrange(5, 10))

    # Find Custom Range button
    driver.find_element_by_css_selector("div.hdtb-mn-hd > span.mn-
dwn-arw").click()
    driver.find_element_by_id("cdrlnk").click()
    driver.find_element_by_id("cdr_min").clear()

    # Fill out date
    driver.find_element_by_id("cdr_min").send_keys(strStartDate)
    driver.find_element_by_id("cdr_max").clear()
```

```
    time.sleep(random.randrange(5, 15))
    driver.find_element_by_id("cdr_max").send_keys(strEndDate)

driver.find_element_by_xpath("(//input[@value='Go'])[2]").click()
    time.sleep(random.randrange(4, 15))
    driver.find_element_by_id("hdtb_tls").click()


def DoSearch(driver, strSearchDate, strSearchTerm, simple=False):

    random.seed()
    SetupSearch(driver, strSearchDate, strSearchDate, strSearchTerm,
simple)

    #Make us look more human
    time.sleep(random.randrange(3, 20))
    '''
    # Find out how many results for this day
    try:
        elm = driver.find_element_by_id('resultStats')
        resultsCount = elm.text
    except:
        resultsCount = 0
    return [strSearchTerm, strSearchDate, resultsCount]
    '''

def SetDates(driver, strStartDate, strEndDate):
    # Click on Search Tools
    driver.find_element_by_id("hdtb_tls").click()
    time.sleep(random.randrange(5, 10))

    # Find Custom Range button
    driver.find_element_by_css_selector("div.hdtb-mn-hd > span.mn-
dwn-arw").click()
    driver.find_element_by_id("cdrlnk").click()
    driver.find_element_by_id("cdr_min").clear()

    # Fill out date
    driver.find_element_by_id("cdr_min").send_keys(strStartDate)
    driver.find_element_by_id("cdr_max").clear()
    time.sleep(random.randrange(5, 15))
    driver.find_element_by_id("cdr_max").send_keys(strEndDate)

driver.find_element_by_xpath("(//input[@value='Go'])[2]").click()
    driver.find_element_by_id("hdtb_tls").click()
    time.sleep(random.randrange(4, 15))

def CorrectDateFormat(strDate):
    str2 = strDate.strip()
    print strDate
    if str2[:len(str2)-1] == '-':
        print "True!"
        return True
    else:
        print "False!"
```

```
        return False

def SavePageResults(driver, outfile):
    dates = []
    links = []

    raw_dates =
driver.find_elements_by_xpath("(//span[@class='f'])")
    for d in raw_dates:
        dates.append(d.text.split('-')[0])

    raw_links = driver.find_elements_by_class_name("r")
    for elm in raw_links:
        a = elm.find_element_by_tag_name("a")
        links.append(a.get_attribute("href"))

    if len(raw_links) > 0:
        LinkInfo = zip(dates, links)
        for link in LinkInfo:
            outfile.writerow([link[0], link[1]])


    time.sleep(random.randrange(3, 12))

    try:

driver.find_element_by_xpath("//a[@id='pnnext']/span").click()
    except Exception as e:
        raw_input('Found an error.  Go check on it!!')
        time.sleep(10, 15)

driver.find_element_by_xpath("//a[@id='pnnext']/span").click()
    time.sleep(random.randrange(15, 25))


def RunAndSaveSearch(driver, outputFN):
    out = csv.writer(open(outputFN, 'a'))
    resultsCount = 0
    pageCount = 0
    print "trying to save"
    try:
        elm = driver.find_element_by_id('resultStats')
        resultText = elm.text.replace(',','')
        print resultText
        words = resultText.split(' ')
        for word in words:
            if word.isdigit():
                resultsCount = int(word)
                break
        if resultsCount > 0:
            pageCount = resultsCount / 10
        #while
driver.find_element_by_xpath("//a[@id='pnnext']/span"):
        print pageCount
        for i in range(0, pageCount):
```

```
            SavePageResults(driver, out)
            try:
                WebDriverWait(driver, 10).until(lambda
s:s.find_element_by_xpath("//a[@id='pnnext']/span").is_displayed())
            except:
                break
    except Exception as e:
        # Less than one page of results.  Just save it.
        print e
        SavePageResults(driver, out)



def SetupSearch(driver, outputFN, strSearchTerm, strStartDate='',
strEndDate=''):
    driver.find_element_by_id("gbqfq").send_keys(strSearchTerm +
"\n")
    #driver.find_element_by_id("gbqfb").click()

    # Wait until page is loaded - in this case, search tools
    WebDriverWait(driver, 5).until(lambda
s:s.find_element_by_id("hdtb_tls").is_displayed())
    if (strStartDate and strEndDate):
        SetDates(driver, strStartDate, strEndDate)
    print "entering runands"
    RunAndSaveSearch(driver, outputFN)



def Old_DoSearch(strStartDate, strEndDate, strSearchTerm):
    fp = webdriver.FirefoxProfile()
    fp.set_preference("browser.download.folderList", 2)
    fp.set_preference("browser.download.manager.showWhenStarting",
False)
    #fp.set_preference("browser.download.dir", dlPath)
    fp.set_preference("browser.helperApps.neverAsk.saveToDisk",
"text/plain")
    fp.set_preference("browser.helperApps.alwaysAsk.force", False)
    driver = webdriver.Firefox(firefox_profile=fp)

    random.seed()
    SetupSearch(driver, strStartDate, strEndDate, strSearchTerm)

    #Make us look more human
    time.sleep(random.randrange(10, 30))
    LinkInfo = []
    dates = []
    links = []
    out = csv.writer(open(outputFN, 'a'))
    while driver.find_element_by_xpath("//a[@id='pnnext']/span"):
        raw_dates = driver.find_elements_by_class_name("f")
        for d in raw_dates:
            dates.append(d.text.split('-'))
```

```
        raw_links = driver.find_elements_by_class_name("r")
        for elm in raw_links:
            a = elm.find_element_by_tag_name("a")
            links.append(a.get_attribute("href"))

        LinkInfo = zip(dates, links)
        for link in LinkInfo:
            out.writerow([strSearchTerm, link[0], link[1]])

driver.find_element_by_xpath("//a[@id='pnnext']/span").click()
        time.sleep(random.randrange(10, 15))
        try:
            WebDriverWait(driver, 10).until(lambda
s:s.find_element_by_xpath("//a[@id='pnnext']/span").is_displayed())
        except:
            break


def BuildSearchString(strTerm, strSite):
    return strTerm + ' ' + 'site:' + strSite


def stripDates(strStart,strEnd):
    return strStart.replace('/','') + "_" + strEnd.replace('/','')

if __name__ == "__main__":

    #i = 0
    #out = csv.writer(open(outputFN, 'a'))

    _DateSearch = False
    parser = argparse.ArgumentParser(prog='GrabGoogleBlogs')
    parser.add_argument("searchTerm", help="Actual Search Term")
    parser.add_argument("site", help="Site to search")
    parser.add_argument("-i", "--issue", help="Issue Name - only
needed if different from search term")
    parser.add_argument("-s", "--start", help="Start Date.  Must
have End Date.")
    parser.add_argument("-e", "--end", help="End Date. Must have
Start Date.")
    args = parser.parse_args()

    strIssue = args.issue
    if not strIssue:
        strIssue=args.searchTerm

    if (args.start and args.end):
        _DateSearch = True
        outputFN = strBasePath + strIssue + "_" + args.site + "_" +
stripDates(args.start, args.end) + '.csv'
    else:
        outputFN = strBasePath + strIssue + "_" + args.site + '.csv'

    fp = webdriver.FirefoxProfile()
    fp.set_preference("browser.download.folderList", 2)
```

```
    fp.set_preference("browser.download.manager.showWhenStarting",
False)
    #fp.set_preference("browser.download.dir", dlPath)
    fp.set_preference("browser.helperApps.neverAsk.saveToDisk",
"text/plain")
    fp.set_preference("browser.helperApps.alwaysAsk.force", False)
    driver = webdriver.Firefox(firefox_profile=fp)

    strSearch = BuildSearchString(args.searchTerm, args.site)

    NavigateToGoogle(driver)
    #Old_DoSearch('01/01/2008', '12/31/2008')
    if _DateSearch:
        SetupSearch(driver, outputFN, strSearch, args.start,
args.end)
    else:
        SetupSearch(driver, outputFN, strSearch)
```

Appendix F:
Python Script: Scraping Wikipedia Pageviews

File: scrapeWikipedia.py

```
import simplejson
import urllib2
import csv
import argparse
import time
from dateutil import rrule, parser
import random


outputFile = 'wikipedia.csv'
strbaseUrl = 'http://stats.grok.se/json/en/'
dtStartDate = parser.parse('2010-01-01')
dtEndDate = parser.parse('2013-12-31')
strIssue = ''


def getDailyCounts(url):
    print url
    data = None
    while data is None:
        try:
            req = urllib2.Request(url)
            opener = urllib2.build_opener()
            f = opener.open(req)
            data = simplejson.load(f)
        except Exception,e:
            print "Error: " + str(e)
            pausetime = random.randrange(60, 150)
            print "Pausing for %i seconds" % pausetime
            time.sleep(pausetime)
            pass

    return data.get('daily_views').items()


def SaveDailyCounts(filename, obj, searchTerm):
    if len(obj) > 0:
        csvwriter = csv.writer(open(filename, 'a'))

        for dailycount in obj:
            csvwriter.writerow([dailycount[0], str(dailycount[1]),
strIssue, searchTerm.rstrip('\n')])

def RunSearch(searchMonth, searchTerm, issue):
    if not (searchTerm[0:1] == '/'):
        searchTerm = '/' + searchTerm
    strUrl = strbaseUrl + searchMonth + searchTerm
    SaveDailyCounts(issue + '.csv', getDailyCounts(strUrl),
searchTerm)
```

```
if __name__ == "__main__":
    parser = argparse.ArgumentParser(prog='Wikipedia')
    parser.add_argument("Issue", help="Name of issue.")
    parser.add_argument("Filename", help="Name of file with list of
pages.  Format /pagename")
    args = parser.parse_args()

    strIssue = args.Issue
    pages = []
    try:
        with open(args.Filename) as f:
            pages = f.readlines()
    except Exception as e:
        print e

    cntPages = 0
    for page in pages:
        cntPages += 1
        print "Now evaluating:"+page
        for dt in rrule.rrule(rrule.MONTHLY, dtstart=dtStartDate,
until=dtEndDate):
            strSearchMonth = str(dt.year) + str(dt.month).zfill(2)
            RunSearch(strSearchMonth, page, args.Issue)
            time.sleep(random.randrange(20,40))
        time.sleep(random.randrange(20,40))
    print "Completed.  Got history for %s pages."%cntPages
```

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